TABLE 8

STEPS IN CHECKING MARKER PROGRESS PUNCHES			
	STEP		
1	2	3	4
NO TK	MAK1	CK	
		FTCK	FS
		FCK	TB-, TG-
	LFK	FTT-, FUT- or	FT-, FU-
		FTK1	VFT- ✓
		HTK1	HGT-
		VTK1	VGT-
	HGK	HTK1	
	TCHK	JG-	
		PNR/PA/PB/PC with P-	
		STP1/STP2	
	FAK/FBK	LV-TS-	LV-, TS-
	LCK	LC-	
	JCK	JC-	
	LK/RK	SF/PR	
	RK3 on SOG AND ITR-SCB only		
TK BUT NO GT2	RL on ITR-SCB and SOG only		
	HMS1		
	SL		
	(No) CON		GLH(No)
	(HTR)LXP1	LXPA	GLH(FCG)
	(With) (HTR)LXP1	LXPA	
	JXPL	JXPA	
	DCT1	DCT	No GT5
GT2 BUT NO DISI	LK1		
	DCT2 on ITR-SCB only		
	DCT3 on TOG only		

TABLE 7

NO. 5 CROSSBAR MARKER PROGRESS PUNCHES FOR DIFFERENT TYPE CALLS AND SUPPORTING PUNCHES

See Note 1	TYPE CALL See Note 2						SUPPORTING PUNCHES	
PUNCH	D	ITR	SOG	RV	TER	TOG	PROGRESS	INFORMATION
TM	X	X	X	X	X	X		
CKG	X	X	X	X	X	X		
DCK					X	X	LR (Link Rise Failures Only)	
GTL	X	X	X	X			CKG	D (DT)/OR (ITR/SOG)
TC1	X							
JXP1	X	X	X	X	X	X	JXPA	CH-
/LXP1	X	X	X	X	X	X	LXPA, JXPA, JXP1	CH-
NE		X		X	X		CKG	LT/OA/OB/PHC/THC
TRN						X	CKG	TAN/TOL (TER)
FCK	X	X	X	X		X		TB-, TG-
FTCK	X	X	X	X		X	FCK	
CK	X	X	X	X	X	X	FTCK	FS-
FML	X	X	X	X		X	CK	
MAK1	X	X	X	X	X	X	CK	
TBK	X	X	X	X		X	MAK1	TB-
/TSE	X	X	X	X		X		TS-
LCK	X	X	X	X	X	X	MAK1	FAK/FBK, LV-
JCK	X	X	X	X	X	X	MAK1 (CH 2 to 9 only)	FT, FU/FTT, FUT, JG-, EF/RF (PR)
TCHK	X	X	X	X	X	X	MAK1	PNR/PA/PB/PC, P2-9
LK	X	X	X	X	X	X	MAK1	JG1,2,4&FUT-(Odd)/JG0,3&FUT-(EV)
RK	X	X	X	X	X	X	MAK1	JG1,2,4&FUT-(EV)/JG0,3&FUT-(Odd)
TK	X	X	X	X	X	X	See Note 3	
FM	X	X	X	X	X	X	See Note 4	
RCY	X	X	X	X	X	X	See Note 5	
RA	X	X	X	X	X	X	See Note 6	
DTK	X	X	X	X			TCHK - See Note 7	
RK1	X	X	X	X				See Note 8
RK2	X	X	X	X				See Note 8
RK3	X	X	X	X			RK1,RK2, Also TC1 on (DT)	
SNK	X	X	X	X		X	See Note 9	SON, FCK, FTCK, FML
CGT	X	X	X	X	X	X		SPL,D/SCB,TOG,SOG - See Note 10
VTK1	X	X	X	X	X	X		VGT- 1/12
HTK1	X	X	X	X	X	X		HGT- 1/10
FTK1	X	X	X	X	X	X		VFT- 1/5
NR		X		X	X	X		RNG
LFK	X	X	X	X	X	X		FT-, FU-/FTT-1/4, FUT-1/10
HGK	X	X	X	X	X	X	LFK, HTK1	
LB		X		X	X		If called line is busy only	
RL		X	X	X	X		TK - CH-	SCB, FAK(ITR),/FAK/FBK(SOG)
HMS1	X	X	X	X	X	X	No LB	FLG, CH-
SL	X	X	X	X	X	X	HMS1	FAK/FBK & LV-
LXPA	X	X	X	X	X	X	HMS1	CH-
HTR	X	X	X	X	X	X		
GLH	X	X	X	X	X	X	CKG,Note 15(No FCG)	
CON	X	X	X	X	X	X	GLH,LXPA Note 15	No GT5 if FLG (CN)
GT2	X	X	X	X	X	X	CON, LXP1 out	
DCT	X	X	X	X	X	X	GT2, No GT5, CKG	
DCT1	X	X	X	X	X	X	See Note 11	See Note 12
LK1	X	X	X	X	X	X	DCT1, GT2, CKG	
DCT2		X					LK1, DCT, GT2, (ITR)	SCB,ITR,RNG,RCK3,CLK/NOC,NS1/AVK1
DCT3						X	TAN & TOLL (See OS 226-1)	
TRL	X	X	X	X	X	X		
BT	X	X	X	X	X	X	See Note 13	
DIS1	X	X	X	X	X	X	See Note 14	No TRS/TGT/PSR
MRL		X	X	X	X	X	Punched only if ORMC or IRMC fails to disconnect on signal from marker.	
JXPA	X	X	X	X	X	X	HMS1	CH-

NOTE 1: / Check for absence of these punches for satisfactory progress on COMB OR COMP MARKERS. On W.S. D.T. markers check for absence of TSE punch only.

NOTE 2: An X indicates when a punch appears.

NOTE 3: JCK, LCK, HGK, TCHK, LK/RK, RK3, (SOG & SCB-ITR).

NOTE 4: Perforated only when marker fails to function properly on failure to match in channel selection.

NOTE 5: Perforated only when marker fails to function properly during a recycle operation.

NOTE 6: Perforated only when marker fails to function properly when route advancing.

NOTE 7: Only if DT calls are waiting in LL on CB of ITR or SOG or on DT marker when comp. marker is setting up CB Conn. while DT marker is making HG selection.

NOTE 8: FT1/4, FU2/5, VG2/6, HG2/5, VF1/5, CT1/3, CU2/5, MAN/2P/CN/None, (SOG/ITR-SCB) LL2/5.

NOTE 9: Checks certain relays down for recycle purposes. Should be absent during recycle & route advance.

NOTE 10: Or if CGT key is operated.

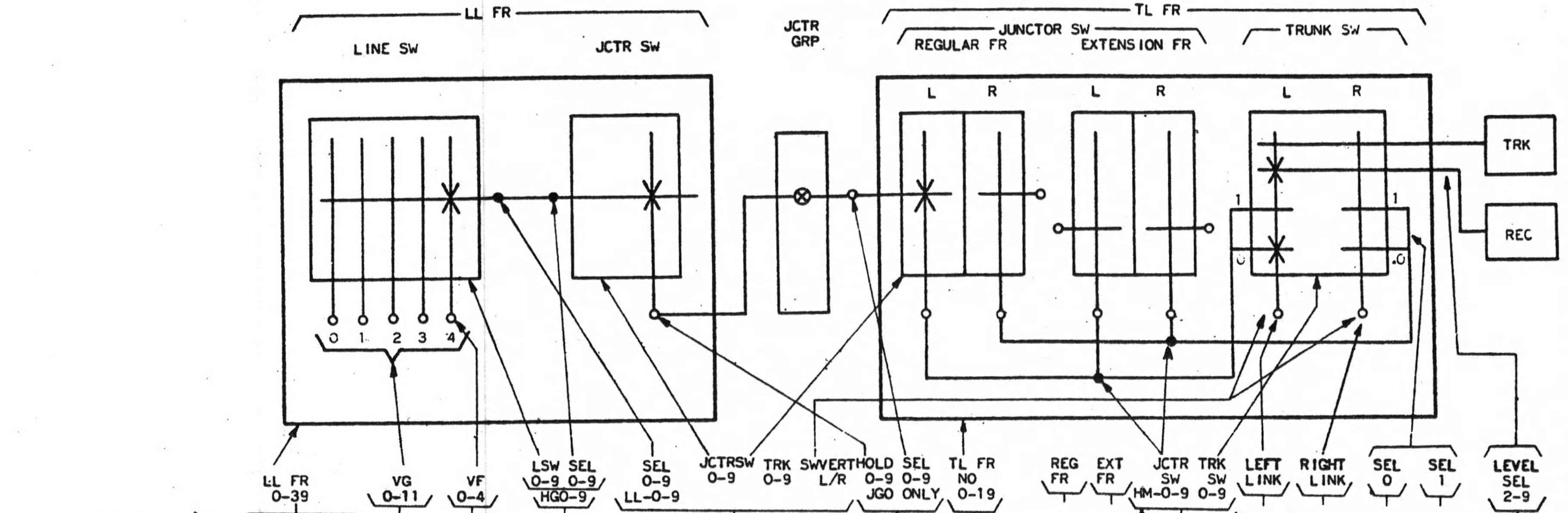
NOTE 11: For DT; DCT, RK1, RK2. For ITR - FLG; DCT. For SOG; DCT. For TER; DCT.

NOTE 12: For ITR or FLG; RNG & RCK3. For SOG; No TTK/OTT, CLK/NOC, NSO/AVK1. For TER; RNG & RCK3. (For TOG, RV not shown.)

NOTE 13: Punched only when marker signals OR to return busy signal when it finds all paths busy (ITR & SOG) or IR to release when it cannot set up connection on trouble.

NOTE 14: For DT; LK1, FML, RK3. For ITR; GT2, DCT2, FML, RK3. For SOG; LK1, FML, RK3. For TER; LK1, PTK. For TOG; LK1, FML.

NOTE 15: Perforated only when HTR is not perforated.



TBL RECORDER CARD PUNCHES		FT- FTT-	FU- FUT-	VG- VGT-	VF- VFT-	HG- HGT-	LL-	CH-	JC-	FS- FG-,TF-	RF	EF	LC-	LK	RK	FAK	FBK	LV-
TYPE CALL		PUNCHES RECEIVED																
DIAL TONE	CALLING LINE	FT- FTT-	FU- FU'- FUT-	VG'- VGT-	VF'- VFT-	HG'- HGT-	LL-	CH-	JC-	FS-	RF	EF	LC-	LK	RK	FAK		LV-
ITR FLG	CALLED LINE →	FTT-	FUT-	VGT-	VF-	HG- #		CH-	JC-	FS-	RF	EF	LC-	LK	RK		FBK	LV-
FORWARD LINE	CALLING LINE →	FT-	FU-	VG-	VFT-	HGT-	LL-											
ITR SCB *ST CALL BK*	CALLING LINE	FT- FTT-	FU- FUT-	VG- VGT-	VF- VFT-	HG- HGT-	(LL-) Ø	CH-	JC-	FS-	RF	EF	LC-	LK	RK	FAK		LV-
SOG	CALLING LINE	FT- FTT-	FU- FUT-	VG- VGT-	VF- VFT-	HG- HGT-	(LL-) Ø	CH-	JC-	FS-	RF	EFG	LC-	LK	RK	FAK	FBK	LV-
TER*M*	CALLED LINE →	FTT-	FUT-	VGT-	VFT-	HGT-		CH-	JC-	FG-,TF-	RF	EF	LC-	LK	RK		FBK	LV-
TOLL OR TAN TOG	LL LOCATION OF INC TRK *	FTT-	FUT-	VGT-	VFT-	HGT-		CH-	JC-	FG-,TF- FS-	RF	EF	LC-	LK	RK	FAK	FBK	LV-

IWGS
OG

NOTES:

* FROM HT-, TT-, UT TO TRUNK NUMBER GROUP

# ON ITR FLG CALLING LINE LOC. IS NOT USED BY THE MARKER BUT IS STORED FOR USED IN THE ITR SCB STAGE

Ø (LL) INDICATES SEL MAG USED ON DT JOB AND MAY OR MAY NOT AGREE WITH CH - PUNCH

FG-, TF- INC TK LOCATION
FS- OGT LOCATION

FIG. 1 IDENTIFICATION OF LL AND TL FRAME LINKAGE FROM NO. 5 CROSSBAR TROUBLE RECORDER CARD

"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS			LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	DESIGNATION	
TRK. LK. & CONNECTOR CKT.	TRK. LK. CONN. CKT.	PREF. CONT. & MAKE BUSY CKT. FOR TRK. LK. CONN.	TRK. LINK CKT.	
ONN	ONN			59G1
1TB or 1SE	1TB or 1SE			59F1
2MB or 2SA	2MB or 2SA			59F1
3FB or 3NA	3FB or 3NA			59E1
4TT or 4NE	4TT or 4NE			59D1
5MT or 5ST	5MT or 5ST			59D1
6FT or 6NT	6FT or 6NT			59C1
7TP or 7RN	7TP or 7RN			59B1
8MP or 8SP	8MP or 8SP			59B1
9FP or 9NP	9FP or 9NP			59A1
AD	AD			92B6
ALC	ALC			33F9
ART	ART			35A7, 99E7
	ARTB			99A7
ASM	ASM			32F7
AST	AST			33F7
ATT	ATT			35A7,99D7
	ATTB			99A7
BLC	BLC			33F9
BRT	BRT			35B7,99E7
	BRTB			99B7
BS0-4	BS0-4			16E8
BSM	BSM			32F7
BST	BST			33F9
BT00-19	BT00-19			18B8
BTT	BTT			35B7,99E7
	BTTB			99B7
	CDN			30H7
CK		CK		16A8
CN	CN			29B1
	CTT0,1,2,4,7			101C1
	CUT0,1,2,4,7			101F1
EF	EF			91C6
	ES			97B2
	ESK			97B2
FAK	FAK			32F7
FB0-19				15C8
	FB0-29			15B8-15C8
FBK	FBK			32G7
FTC-,FR0-9			FTC-,FR0-9	14E4
FTC-,FR10-19			FTC-,FR10-19	14E8
FTC-,FR20-29			FTC-,FR10-29	89D4
	FT0-3			1G4
	FU0,1,2,4,7,			1G5
G0-4	G0-4			13E8
G0A	G0A			13D8
HF	HF			77G1
	HG0,1,2,4,7			1G6
INC	INC			88D6
J0-9	J0-9			33F4
JC0-9	JC0-9			13B7
JS0-9	JS0-9			32E3
L	L			12C8
L0-8	L0-8			10D3
LCK	LCK			33F8
LH0-9	LH0-9			33F9
LK	LK			12E8
LVK	LVK			32H7
4AK	MAK			16G8
MDK	MDK			16G8
NH	NH			85B1
NN	NN			85B1
NT	NT			85B1
OD	OD			92B6
OF	OF			88D6
	OV			78H4

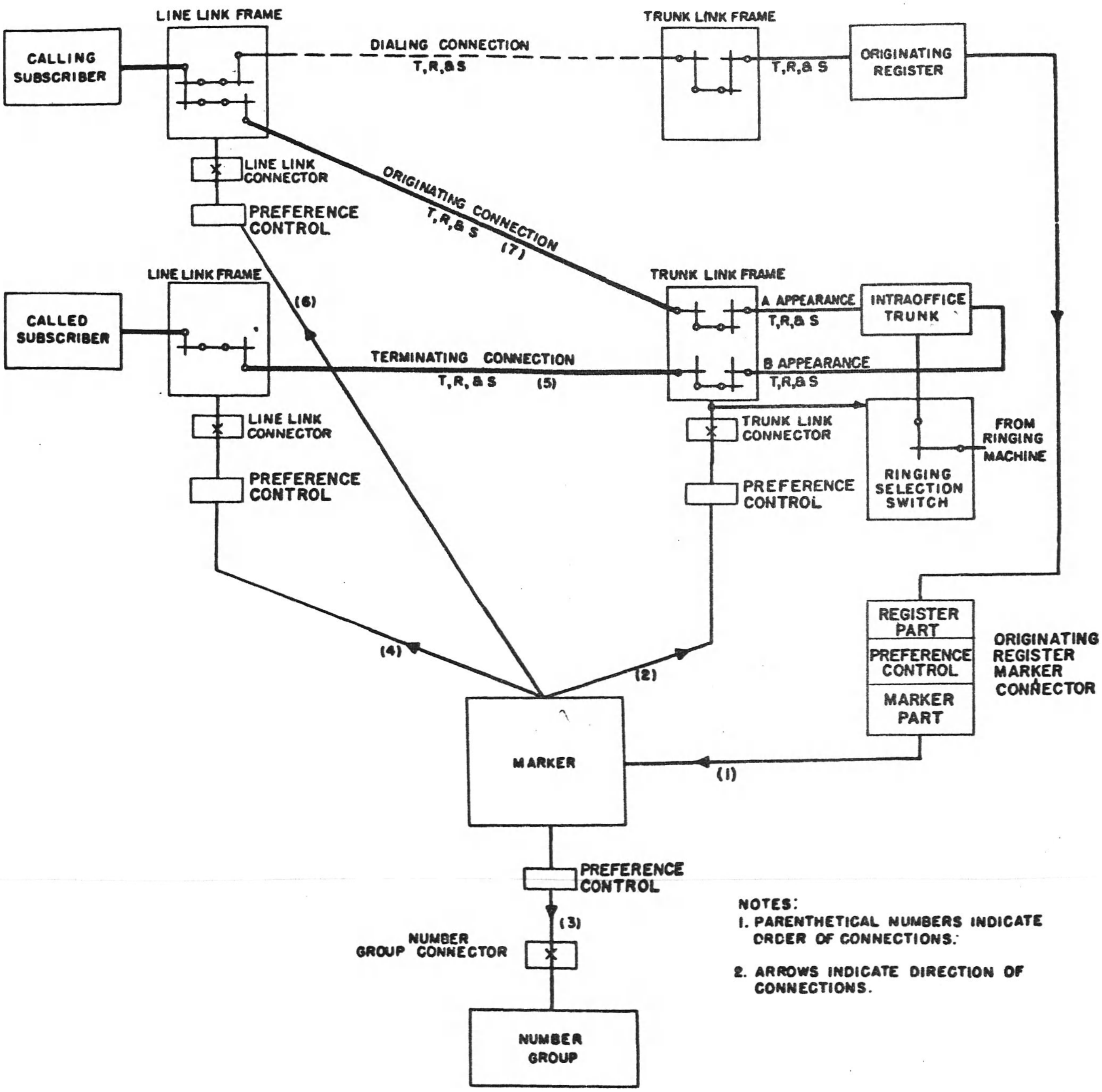
"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS			LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	DESIGNATION	
TRK. LK. & CONNECTOR CKT.	TRK. LK. CONN. CKT.	PREF. CONT. & MAKE BUSY CKT. FOR TRK. LK. CONN.	TRK. LINK CKT.	
P0-9	P0-9			10D2
PR	PR			9D7
	PRI			98A1
R	R			12C8
RC	RC			30B1
RF	RF			91A6
RK	RK			12D8
RN10	RN10			59G1
RN11	RN11			59F1
RN12	RN12			59F1
RN13	RN13			59E1
RN14	RN14			59D1
RN15	RN15			59D1
RN16	RN16			59C1
RN17	RN17			59C1
RN18	RN18			59B1
RN19	RN19			59A1
RS0,1	RS0,1			78A1
RS2-9	RS2-9			78E1
RSK	RSK			78G1
S1	S1			33F9
SEF	SEF			91E6
SF	SF			91E7
SLK	SLK			44C7
SS0-9	SS0-9			44C7
ST-		ST-		16C8
SZA	SZA			9A4
SZB	SZB			9A4
SZC	SZC			9A4
TB0-5	TB0-5			18A8
	TB6-9			18A8
TBK	TBK			18E8
TC	TC			30C1
TCB	TCB			88E6
TG00-19	TG00-19			18C8
TLF	TLF			79F6
TP	TP			30E1
TSX	TSX			32E7
TT	TT			47F7
TTA	TTA			47H7
	TTF			9E7
TTM	TTM			47H7
	VF0-4			1G6
	VG0,1,2,4,7,10			1G5
XFT	XFT			14E9
		PREF. CONT. & MAKE BUSY CKT FOR PRI LINK		
		ST-		96A1
		TMB		96B1

DESIG.	LOC
MASTER TEST FRAME CONN CKT	*
AD	92A7
AD'	92A7
AK	64A9
AL	40F4
ALT	40F4
AMA	49F6
AN	74G9
AR0,1,2,4,7	46H5
ATT	21A2
AVK1	44A5
B0,1,2,4,7	51-55D2
B'0,1,2,4,7	51-55D8
BLC	34A9
BN	66A0
BR0,1,2,4,7	46H5
BRL	38A5
BRT	99C7
BST	34A4
BT	38A5
BTT	99C7
BY	41F9
C0,1,2,4,7	51-55D2
C'0,1,2,4,7	51-55D8
CAM	27G0
CAMA	29H6
CAMF	21H2
CAMS	21A2
CD0,1,2,4,7	93D6
CD'0,1,2,4,7	95D3
CDN	30G9
CE	96F5
CE'	96F5
CGA	7F1
CGB	7G1
CGT	35H2
CH0-9	31A4
CHA	31A1
C1	80F4
CK	16A7
CKG	37E0
CKG1	37D0
CK0	64D0
CKR	64F0
CL1	48E6
CL2	48E6
CL3	48F6
CL4	48G6
CL5	48G6
CL6	48H6
CL7	48D6
CL8	48D6
CLG	29F0
CLK	29C0
CLT1	29F0
CLT2	29E0
CN	29C0
CNR	28E0
CNS	84H0
CON	35F2
CP0,1,2,4,7	50B6
CR	20C9
CR0,1,2,4,7	48B6
CRU0,1,2,4,7	7E1
CS	96F5
CS0-29	6E1
CT0,1,2,4,7	7B1
CTA0,1,2,4,7	7B1
CTT0,1,2,4,7	101B1
CTUK	100B5
CU0,1,2,4,7	7C1
CUT0,1,2,4,7	101B1
D	20F9
D0,1,2,4,7	51-55D2
D'0,1,2,4,7	51-55D8
DCK	23F9
DCT	36E0
DCT1	36C0
DCT2	36C0
DCT3	36D0
DIS	37A8
DIS1	37A8
DL1-6	49G2
DNC	93D2
DNGA	61E0
DNGB	61F0
DNGC	6JG0
DNGD	61F0
DR	28G0
DTK	4E4
E0,1,2,4,7	51-55D2
E'0,1,2,4,7	51-55D8
ECN	63F0
EF	91F6
EG	65H0
EN	63D9
ESCK	97F7
EXB	80G4
EXG	80G4
EXT	83A1
F	23F9
F0,1,2,4,7	51-55D2
F'0,1,2,4,7	51-55D8
FAC	21A2
FAD	27G0
FAK	32F4
FBK	32G4
FC	93D2
FCG	34E9, 35A4
FCK	17H0
FG0	16C0
FG1	16D0
FG2	16D0
FLG	23F0
FM	40A3
FML	15B0
FNA	70D9
FNB	70D9
FS0-9	16H0
FS10-19	16H0
FS20-29	16H0
FT0-3	1C1
FT'0-3	1C1
FTC	15B0
FTCK	15B0
FTK1	6D0
FTT0-5	3D9
FU0,1,2,4,7	1D2
FU'0,1,2,4,7	1D2
FUT0-9	3D0
FVD	20E3
G	4E4
G0,1,2,4,7	51-55D2
G'0,1,2,4,7	51-55D8
GLH	34C9
GPA	40E4
GPB	40E4
GS1-5	17C9
GT2	34E9
GT5	35G5
GTL	57B9
H0,1,2,4,7	51-55D2
H'0,1,2,4,7	51-55D8
HF	77D0
HFA	27G0
HG0,1,2,4,7	1D5
HG'0,1,2,4,7	1D5
HGK	6E2
HGT0-9	5D9
HMS1	34D9
HN0-9	67E7
HT0,1,2,4,7	51-55D2
HTK1	5C5
HTR	84G0
HTUK	62F0
INC	21F2
IT	96F5
ITB	96F5
ITL	96F5
ITR	22A9
J0,1,2,4,7	51-55D2
J'0,1,2,4,7	51-55D8
JC0-9	13B6
JCK	31H6
JG0-4	12B0
JSQ0-5	9C0
JXP1	34D9
JXPA	34C9
K0,1,2,4,7	51-55D2
K'0,1,2,4,7	51-55D8
KJSQ	9G5
L0,1,2,4,7	51-55H2
L'0,1,2,4,7	51-55H8
L5D	50F6
LB	66F0
LCD0-2	93A2
LCH	59B3
LCK	33H8
LDT	83E9
LESK	97B2
LFK	4A4
LHM	34B0
LHMT	34B0
LI	77D9
LIN	66F9
LK	12E5
LK1	36C0
LK2	37D8
LK3	37D8
LL0,1,2,4,7	33G0
LLES	97D2
LL1	62E0
LLJ	34A4
LR	23E9
LST	50G6
LT	20C3
LT1	20A2
LT2	20A2
LXP1	34B9
LXPA	34D9
M	79E4
M7	55H2
M'7	55H8
MAK1	16H0
MB	39F1
MB0,1,2,4,7	49B6
MF	20F9
MIT	39G1
MKA	80F4
MKB	80E4
MKT	80E4
MOI	37A8

* WHEN OFFICE TEST FRAME CIRCUITS ARE PROVIDED, CONNECTING LEADS TO MARKER ARE SPECIFIED ON OFFICE TEST FRAME CIRCUIT DRAWINGS.

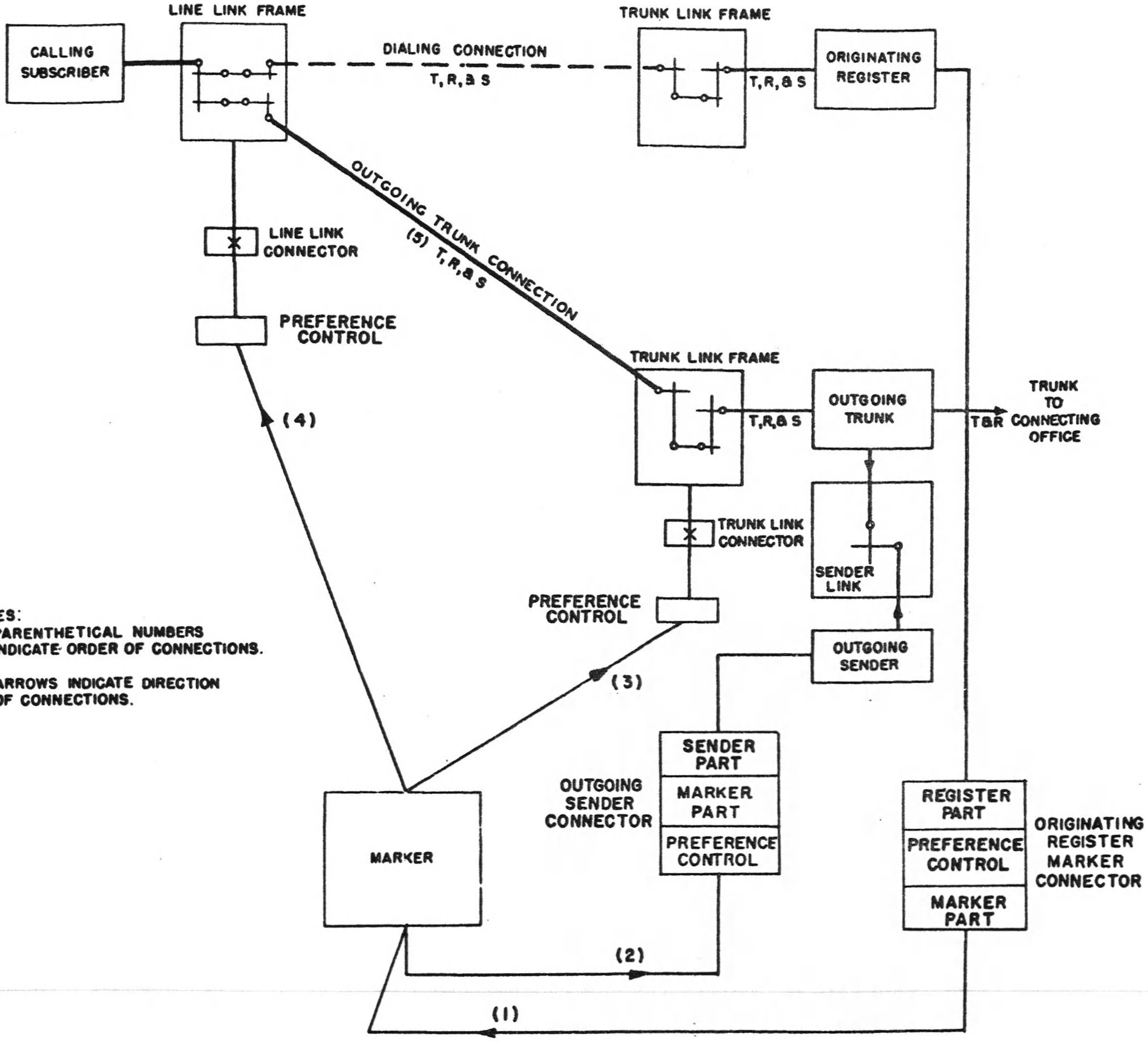
"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS		LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	
ORIG. REG. MKR. CONN. CKT.	ORIG. REG. MKR. CONN. CKT. MKR. PART	PREF. CONT. CKT. FOR ORIG. REG. MKR. CONN.	
TM	TM		39H5
TP	TP		7E1
TR2	TR2		22B1
TRK	TRK		22B1
TRL	TRL		38A6
TRS	TRS		22B1
VFO-4	VFO-4		1C8
VGO,1,2,4,7,10	VGO,1,2,4,7,10		1C8
X11	X11		20B2
OUTGOING SDR. CONN. CKT.	OUTGOING SDR. CONN. CKT.(MARKER PART)	PREF. CONT. & MAKE BUSY CKT. OUTG. SDR. CONN.	
4DG	4DG		50F8
5DG	5DG		50F8
AO,1,2,4,7	AO,1,2,4,7		51-55D8
AD	AD		92A8
AMA	AMA		49G8
ARO,1,2,4,7	ARO,1,2,4,7		46D6
AV	AV		36H6
BO,1,2,4,7	BO,1,2,4,7		51-55D8
BRO,1,2,4,7	BRO,1,2,4,7		46E6
C	C		79H6
CO,1,2,4,7	CO,1,2,4,7		51-55D8
	CDO,1,2,4,7		95F4
CL1-8	CL1-8		48G7
CPO,1,2,4,7	CPO,1,2,4,7		50B8
CRO,1,2,4,7	CRO,1,2,4,7		48C7
DO,1,2,4,7	DO,1,2,4,7		51-55D8
DL1-6	DL1-6		49G8
EO,1,2,4,7	EO,1,2,4,7		51-55D8
FO,1,2,4,7	FO,1,2,4,7		51-55D8
FTO-3	FTO-3		1D7
FUO,1,2,4,7	FUO,1,2,4,7		1E7
GO,1,2,4,7	GO,1,2,4,7		51-55D8
SUB GRP A	SUB GRP A		
GBO or GBE	GBO or GBE		43A8
SUB GRP B	SUB GRP B		
GBO or GBE	GBO or GBE		43B8
HO,1,2,4,7	HO,1,2,4,7		51-55D8
HGO,1,2,4,7	HGO,1,2,4,7		1G7
JO,1,2,4,7	JO,1,2,4,7		51-55D8
KO,1,2,4,7	KO,1,2,4,7		51-55D8
LO,1,2,4,7	LO,1,2,4,7		51-55D8
LBD	LBD		50F8
LST	LST		50F8

"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS		LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	
OUTGOING SDR. CONN. CKT.	OUTGOING SDR. CONN. CKT.(MARKER PART)	PREF. CONT. & MAKE BUSY CKT. OUTG. SDR. CONN.	
M	M		79G2
M7	M7		55H8
MA	MA		43E2
MB	MB		43E2
MBO,1,2,4,7	MBO,1,2,4,7		49B7
MC	MC		43F2
MON	MON		79D2
ND	ND		47E6
NOB	NOB		49G8
OBS	OBS		49G8
OD	OD		92B8
ON1	ON1		44E7
ORCO	ORCO		92C8
ORC1	ORC1		92C8
ORC2	ORC2		92D8
OSO-4	OSO-4		43D7
SUB GRP A	SUB GRP A		
OSGAO-9	OSGAO-11		42E8
SUB GRP B	SUB GRP B		
OSGBO-9	OSGBO-11		42F8
RNO,1,2,4,7	RNO,1,2,4,7		58C1
RO	RO		37F5
RP	RP		30H2
S	S		43G8
SO-4	SO-4		43G8
SAM	SAM		43F2
SBM	SBM		43F2
SC	SC		49G8
SCM	SCM		43G2
SLP	SLP		79H6
SUB GRP A		SUB GRP A	
SKA		SKA	42E8
SUB GRP B		SUB GRP B	
SKB		SKB	42G8
SLP	SLP		79H6
SUB GRP A		SUB GRP A	
ST		ST	43E8
SUB GRP B		SUB GRP B	
ST		ST	43F8
TG	TG		37E8
TM	TM		30A3
TP	TP		30G2
TSR	TSR		57A6
TSR-1	TSR-1		57A2
TVT	TVT		49G8
VFO-4	VFO-4		1G7
VGO,1,2,4,7,10	VGO,1,2,4,7,10		1F7
XS	XS		43H8
XSA	XSA		43G2



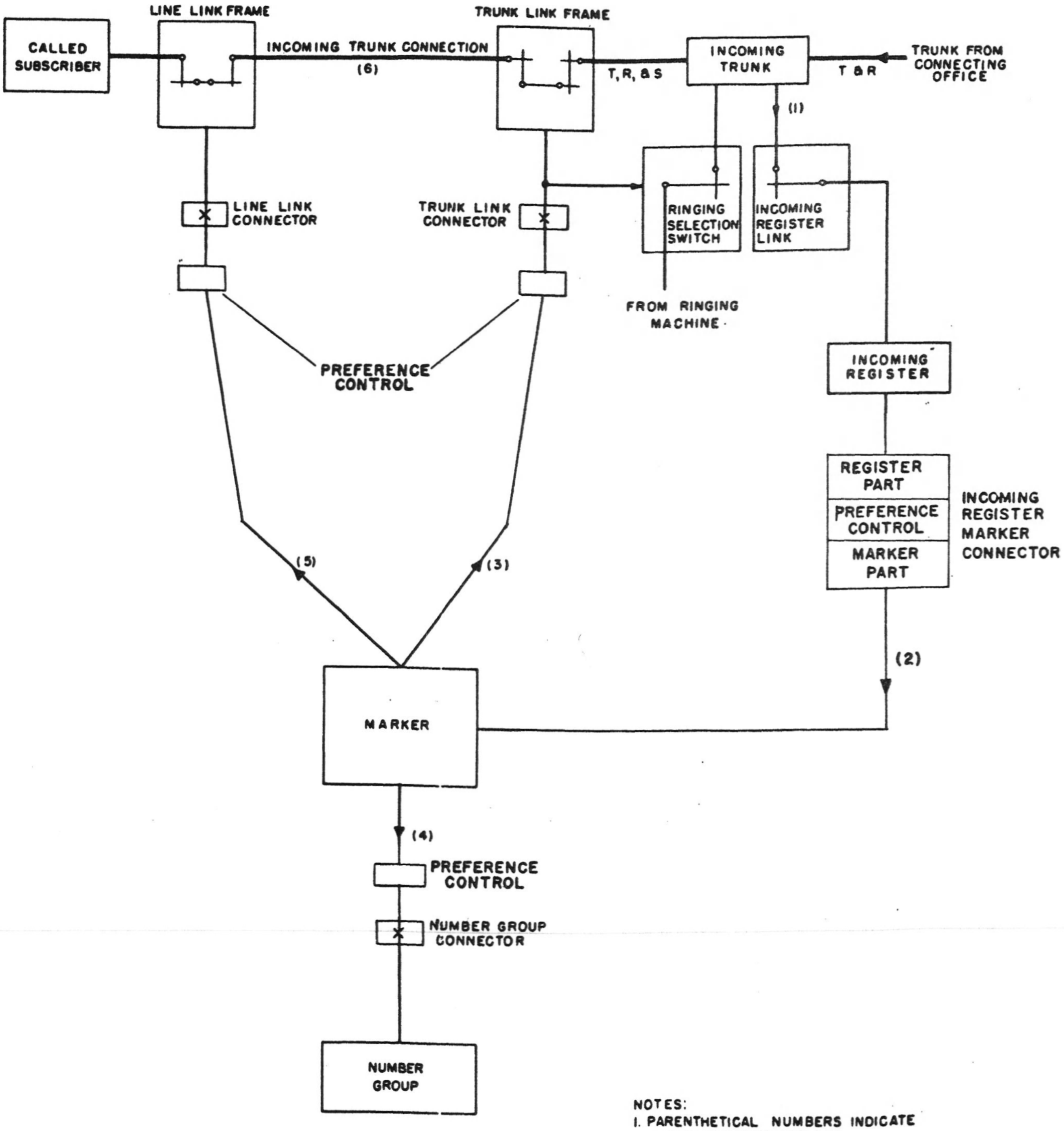
NOTES:
1. PARENTHETICAL NUMBERS INDICATE ORDER OF CONNECTIONS.
2. ARROWS INDICATE DIRECTION OF CONNECTIONS.

FIG. 8
ESTABLISHING INTRAOFFICE TRUNK CONNECTION



NOTES:
1. PARENTHETICAL NUMBERS INDICATE ORDER OF CONNECTIONS.
2. ARROWS INDICATE DIRECTION OF CONNECTIONS.

FIG. 9
ESTABLISHING OUTGOING TRUNK CONNECTION



NOTES:
1. PARENTHETICAL NUMBERS INDICATE ORDER OF CONNECTIONS.

2. ARROWS INDICATE DIRECTION OF CONNECTIONS.

FIG. 10
ESTABLISHING INCOMING TRUNK CONNECTION

DESIG.	LOC
ALL MARKERS BUSY OR ALL TRANSVERTERS BUSY CKT	
AB	39D1

AUTOMATIC MONITOR REG. & SDR TEST CKT	
DIS	37B0
MKB	80E0
MON	79E2
MON1	81E7
MONL	79B2
MTR	81C7
OSM	79H2
OSS	81A7
RA	81B7
RBT	41G2
RLT	38G6
RTST	81H7
SCT	81F7
SON	42F2
ST	81A7

AUTOMATIC PROGRESSION TRK TST CKT	
CGA,B	6H4
ETSO,1	18G0
MT3	79D7
MT9	79D7
OTSO,1	18G0
1T0-9	18C0
TT10-19	18C3
TTA	47H6

CENTREX TRAFFIC REG TRNSL CKT	
CG0-9	102A1
CST0-9	102B1
CSU0-9	102B1
INCG	102D1
ITCK	102D2
LDN	102D2
ORCG	102E1
TRF	102C1
ZA	102C1

DESIG.	LOC
FOREIGN AREA TRANSLATOR CONN CKT	
A0,1,2,4,7	51-55D1
B	39E7
B0,1,2,4,7	51-55D1
C0,1,2,4,7	51-55D1
CGC	26B0
CGD	28B0
CMF	24H4
CMS0-1	24H4
D0,1,2,4,7	51-55D1
E0,1,2,4,7	51-55D1
F0,1,2,4,7	51-55D1
FAR00-99	28C1
FAT-(A)	27C8
FAT-(L)	27B8
G0,1,2,4,7	51-55D1
H0,1,2,4,7	51-55D1
HN0,1,2,4,7	51-55D1
J0,1,2,4,7	51-55D1
K0,1,2,4,7	51-55D1
LT	60F1
LT1	60F1
MB	39E7
NE	60G1
OR	21C7
RO	24H1
RYT	84C5
SF	83A4
SF1	83A3
TAN	21D7
TH0,1,2,4,7	51-55D1
T0,1,2,4,7	51-55E1
TOL	21E7
U0,1,2,4,7	51-55E1

DESIG.	LOC
INC REG TST CKT	
B	81E1
BRL	38H5
DIS	37B2
MT13	79A6
RBT	41H2
RTST	81E1
TRR	37E2

MASTER TEST CONTROL CIRCUIT *	
ASB	43H2
BRL	38H6
CGA,B	6G4
DIS	37A1
DISC	37A1
ETSO,1	18G0
FTC0-9	14E1
FTC10-19	14E5
FTC20-29	89E1
LHC	34A0
LL0-9	85E8
LLF	79G8
LP	79E8
MT2	79C8
MT3	79B8
MT8	9H5
MT9	79D8
MT10	71F8
MT19	71F8
NDT	47E9
NGF	79H8
NGTA-H	75H6
NTLH	85H9
NTR	36A7

DESIG.	LOC
MASTER TEST CONTROL CIRCUIT *	
OTSO,1	18G0
OTT	47G5
RBT	41H2
RLT	38H6
TNGA	72E6
TRR	37E2
TT0-9	18C0
TT10-19	18C3
TTM	47H6

MASTER TEST FRAME CONN CKT *	
ONN	59G2
ITB OR ISE	59G2
2DT	20D3
2MB OR 2SA	59F2
2W	95C9
3FB OR 3NA	59E2
4DG	50E6
4TT OR 4NE	59B2
4W	95C9
5DG	50E6
5MT OR 5ST	59D2
6FT OR 6NT	59C2
7TP OR 7RN	59C2
8MP OR 8SP	59B2
9FP OR 9NP	59A2
11	20B3
A	64G9
A0,1,2,4,7	51-55D2
A'0,1,2,4,7	51-55D8
ACD	93B2

DESIG.	LOC
MASTER TEST FRAME CONN CKT *	
U0-9	69E7
UK	62D4
UT0,1,2,4,7	51-55D2
VF0-4	1D7
VF'0-4	1D7
VFT0-4	6D0
VG0,1,2,4,7,10	1D4
VG'0,1,2,4,7,10	1D4
VGT0-11	5D0
VTC	93C2
VTK1	5C4
WKC	93E2
WT	84F0
XII	20A3
XAB	31H6
XAN	72F5
XBT	86E7
XBRL	96F5
XCE	96F5
XCH	86B7
XCKR	86B6
XCL	86A6
XCLC	86G6
XCP	86A6
XCR	86G7
XCS	86A7
XDL	86B6
XF	86B7
XFT	86F7
XFUT	3G9
XHG	86B7
XJC	86B7
XJG	86C7
XJS	86C7
XLC	86C7
XLG	86D7
XLH	34C9
XLO	86B6
XLR	86D7
XLS	86F7
XLV	86D7
XMB	49E7
XMRL	86C6
XN	86C6
XOB	86C6
XPC	96F5
XPG	86F7
XPT	86D6
XRL	86D6
XRS	86A7
XRSI	86D6
XS	86E6
XSA	86E6
XSL	34D9
XSS	86E6
XT	86F6
XT5	86F6
XTB	17G0
XTBI	86F6
XTG	18H8
XTGI	86A7
XTRK	86F7
XTRL	86G7
XTS	86E7
XTSI	86A6
XTV	86F6
XVGB	86E7

MASTER TEST FRAME, JACK, LAMP & KEY CKT. *	
*AC-DC AUD or ± AUD	35C0
AMB	39E1
CCT	35G0
CGT	35G0
CLPT	37H3
DL	81G1
DLB	81G1
FG	39D6
LK	38E1
LR	81D1
MB	39E1
MBL	39D1
MJ	38D1
MN	38D1
PSR	81H1
*RING G	35C0
RT0-4	59B8
SCBA0-3	42G1
SCBB0-3	42G1

* VIA DT MKR

DESIG.	LOC
MASTER TEST FRAME PLANT REGISTER CIRCUIT *	
GTF	38G1
LRF	38G1
MST	38G1
TR	38G1

MISCELLANEOUS CKT. (MARKER)	
+130V	39C7
AR	39E7
B	39E7
FA	39C7
FAI	39D7
FG	39D7
TA	39D8
TRT	39D8

DESIG	LOC
ORIGINATING LINE IDENTIFIER CKT	
ACL	37B7
AOA	6B9
CGA	6G3
CGB	6G2
CH0-9	31A7
CKG	37A1
CNA	6A8
COX	87G1
CS0-29	6D3
D	28G1
D1S	37C7
D1S1	37C7
DTK	4D7
FT0-3	1A8
FU0,1,2,4,7	1A8
GTL	57A9
GTL1	57A9
HG0,1,2,4,7	1A8
LG1	4B7
LG2	4B7
LK	102B7
LSP	102F7
LSP0	102F7
LSP1	102E7
LSP2	102E7
LSP3	102C7
LSP4	102C7
LSP5	102C7
MB	39H3
MF	28G1
MRA	6C9
MRL	38A6
MXT	86A1
OLI	102A7
OLIT	102C7
RB	102G7
RCY	102C7
RK1	2F0
RK2	2F0
TK1	31G1
TK2	31G1
TM	39H3
TR2	22A1
TRK	22A1
TRR	37C6
TRST	8CF1
VF0-4	1B8
VFT0-4	6B0
VG0,1,2,4,7,10	1A8
XT1	48E0
XLH	34C0

* WHEN OFFICE TEST FRAME CIRCUITS ARE PROVIDED, CONNECTING LEADS TO MARKER ARE SPECIFIED ON OFFICE TEST FRAME CIRCUIT DRAWINGS.

DESIG.	LOC
MASTER TEST FRAME CONN CKT	*
MON	79B2
MPT	85D3
MRL	38A6
MT	79A7
MT1K	80A4
MT2K	80B4
MT3K	80B4
MT5	19H6
MT7	11G7
MT8K	80C4
MT9K	80B4
MT10K	80C4
MT12	79B7
NAMA	58F1
NDI	47D8
NDK	47F9
NDT	47D8
NE	60F6
NGK	62C4
NGKI	62D4
NH	85C0
NN	85C0
NOB	47C8
NOB'	49G8
NOBT	47B6
NOC	29D0
NR	62G0
NS1	42C4
NS0	42A4
NT	85D0
NTH	85C3
NTT	85D3
OA	20F3
OB	20F3
OBS	47C8
OBS'	49H6
OBST	47B6
OCN	63G0
OD	92A7
OD'	92A7
OFH	77D9
OP	29C0
OPR	28D0
OR	21A2
ORC'0-2	92A7
ORK	56A0
OS0-4	43C4
OSC	42D0
OSE	43D4
OSG0-11	42B4
OSK	44C3
OST2	57B9
OTT	47E9
OV	41E9
OVK	78H4

DESIG.	LOC
MASTER TEST FRAME CONN CKT	*
P0-9	10E2
PA	11D7
PB	11D7
PBN	70C9
PBX1	64A0
PC	11D7
PCD	21F2
PCD1	21F2
PCK	98B2
PCR	21E2
PD	20D9
PE	11E7
PHC	20G3
PK	20D9
PLS'	96F5
PN	63A9
PNR	11A7
PR	9F9
PRCY	66E0
PRI	98B1
PS	20E9
PTK	63B4
PTN	63C9
PUL	66C0
RA	41D9
RBT	41G9
RBT1	41F9
RC	30B2
RCCK	81F0
RCK2	77D9
RCK3	77D9
RCT	77D0
RCT1-15	77D0
RCY	41E9
RE	101C9
RF	91F6
RG	96F5
RI	66A0
RK	12E5
RK2	2F0
RK3	2G0
RL	38A6
RN0,1,2,4,7	58D1
RNG	62E4
RNK	58A1
RNT2	58F1
RO	21G2
RO'	37F0
ROA	24G5
ROG	37F0
RON	80G4
ROT	37F0
RP	7D1
RPK	30H3
RS0-9	78A8

DESIG.	LOC
MASTER TEST FRAME CONN CKT	*
RSC	57E9
RSK	78H0
RT	96F5
RTST	42D4
RV	23D0
S0-9	71D5
SAE	71D5
SB	40D4
SBT	40D4
SC	49G6
SCB	23A0
SCK	20B9
SCN	20B9
SDT	83E9
SEF	91F6
SF	9F9
SIA	42A5
SIB	42B5
SL	34C9
SLCK	64E9
SLK1	44B5
SLK2	44B5
SNG	62D0
SNK	40G0
SOG	22C9
SON	42E0
SP	85H0
SPC	85H0
SPL	85E0
SQA	9A0
SRK	77D9
SRT	23F9
SSA	44G0
SSB	44G0
STP1	31G6
STP2	31F6
T0-9	68E7
TAN	21A2
TAN0	21B2
TAN1-3	21C2
TAN4	21D2
TB	40C4
TB6-9	17F0
TB0-5	17E1
TBH	77D0
TBI	66C0
TBK	18H8
TBT	40C4
TC	30D2
TCA	21G2
TCB	21H2
TCH	59C3

DESIG.	LOC
MASTER TEST FRAME CONN CKT	*
TCH0-9	11D4
TCHK	11H4
TCKI	77D9
TDCT	36E0
TER	22F9
TESK	97B2
TF0,1,2,4,7	16F0
TG0-19	17F0
TGT	37A8
THC	20H3
TIN	66G9
TK	31G8
TLES	97D2
TLH	34B9
TM	39G1
TMK	36D0
TMKI	36E0
TN	63B9
TNK	70D9
TOB	27G0
TOBS	27G0
TOG	22D9
TOL	21B2
TOS0-4	43C4
TP	7D1
TP'	30F2
TR1	37H0
TR2	22D0
TRB	81C1
TRF	21A2
TRK	22C0
TRL	38A5
TRL1	37G0
TRL2	37G0
TRN	60E6
TRR	37E0
TRS	22D0
TRST	80D4
TRT	35A6, 99C7
TS0-19	19D9
TSC5	21E2
TSE	19H9
TSE1	19G6
TSE2	19G6
TSR	57A9
TST	23D9
TT	20C3
TT0,1,2,4,7	51-55D2
TTC	30D2
TTF	9G9
TTG	47G6
TTK	47G6
TTT	35A6, 99C7
TVT	49F6
TWT	42D4

DESIG	LOC
OUT SDR GRP RELEASE CKT	
A0-11	44G6
POWER RINGING AND TONE FRAME CIRCUIT	
AC-DC AUD. OR ± AUD.	35B0, 99E0
RING G	35B0, 99E0
MB	39F5
PL	82H4
+130V	83G6
REGISTER PRIORITY LINK	
COC	96B1
CS	96C1
PLS	96D1
RT	96D1
T0-9	46B8, 82E2
U0,1,2,4,7	46H6
SENDER CKT	
SUB GROUP A	
S1E	42B8
S1O	42B8
SUB GROUP B	
S1E	42C8
S10	42C8
WAE	44F7
WAO	44F7

DESIG	LOC
SERVICE OBSERVING REG CONN	
A0-H0,J0-L0	51B1
A1-H1,J1-L1	52B1
A2-H2,J2-L2	53B1
A4-H4,J4-L4	54B1
A7-H7,J7-M7	55B1
CK	47B6
SOC	27H3
SERVICE OBSERVING TRK SELECTION & CONTROL CKT	
CAMA	27G1
FAD	27G2
HFA	27G2
TRAFFIC REGISTER CIRCUIT	
1FM	88C5
1P	88F5
ASB 0-11	88G4
ATT	88G5
BNA	88G5
DC1	88H5
DR0-19	88H4
FAD	88B4
FAM	88B4
BM	88C5

DESIG	LOC
TRAFFIC REGISTER CIRCUIT	
IFM	88C5
IPC0-9	88D4
LTD	88C4
LTM	88C4
OF	88E4
OP	88F5
OSG0-11	88B5
OVF0-9	72H6
PB	88F5
PC	88C4
PCL	88C5
PCM	88G5
PCSC	88F5 88H5
PCT	88A4
PCT00-39	88H4
PCV00-99	88H4
PDD	88B4
PDM	88B4
PL1	82H7
PLSC	88G4
RIA	88H5
RIP	88H5
S0-9	88A5
TBI	88H5
TCH	88G4
TCO	88C4
TIP	88C5
TLDN	88G5
TMOR	88C4
TOR	88C4
TPC	88G4
TTRF	88G5
VCI	88H5

DESIG	LOC
TRAFFIC USAGE RECORDER	
MB MBM	39G8

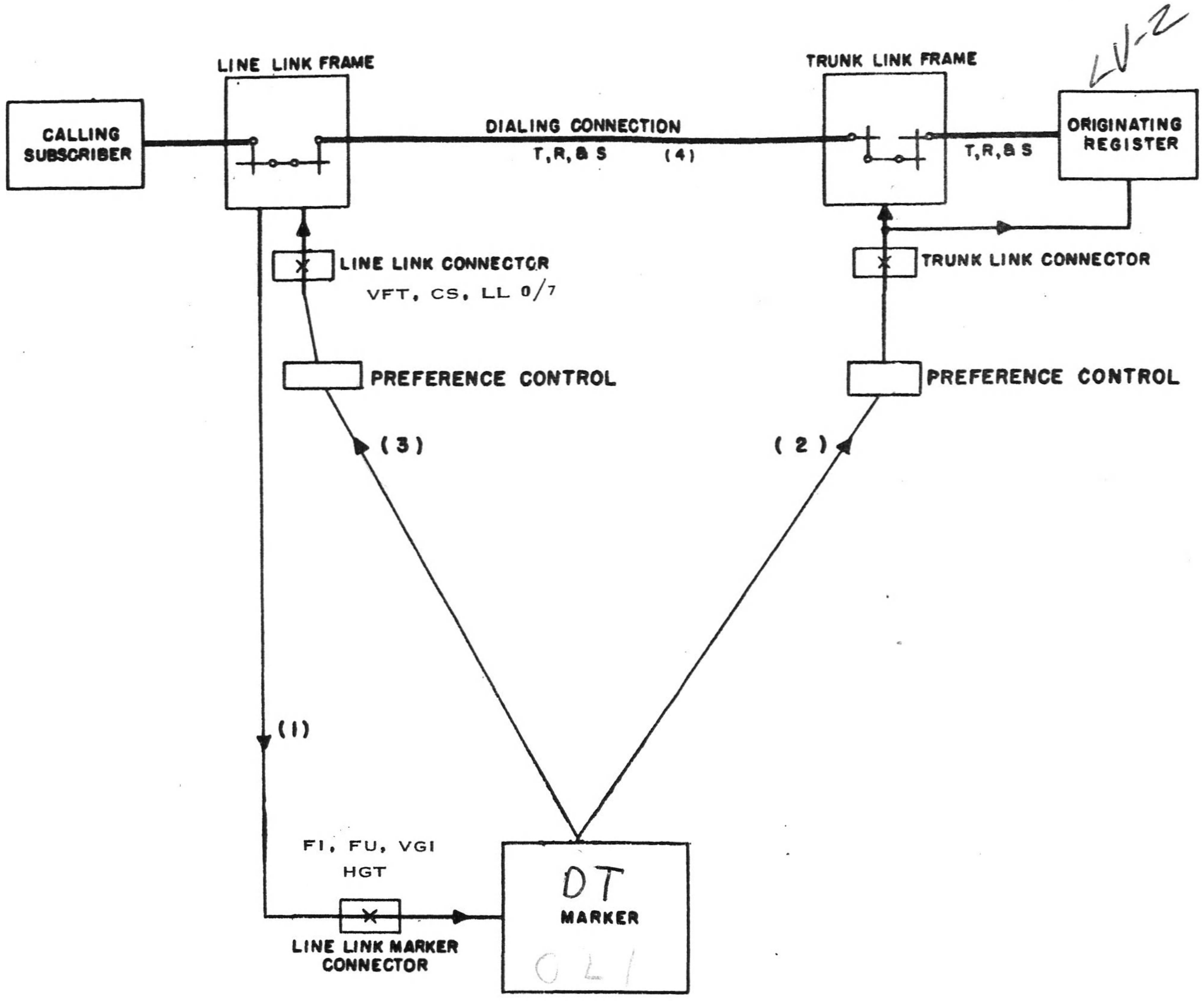
"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS			LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	DESIGNATION	
NO. GRP. & CONN. CKT.	NO. GRP. CONN. CKT.	PREF. CONT. & MAKE BUSY CKT. FOR NO. GRP.	NO. GRP. CKT.	
AK	AK			64B7
ANK	ANK			72C6
ANO-3			ANO-4	75D3
BNK	BNK			63F6
BS1-4	BS1-4			62B8
	DIR			70H6
EG	EG			65G2
EN	EN			63E6
EN1	EN1			63E6
FN	FN			70E1
FNA	FNA			70D6
FNB	FNB			70E6
FTO-3	FTO-5			70A6
FUO-9	FUO-9			70A6
HBO-9	HBO-9			67E7
HGO-9	HGO-9			70B6
L	L			70F1
LA	LA			65C2
LHB	LHB			67B7
NGF	NGF			79H6
NGK	NGK			62C8
OA	OA			65C2
OFK	OFK			70F6
OHB	OHB			67A7
OOF	OOF			88F3
OTB	OTB			65D2
PBN	PBN			70H6
PMO	PMO			70G6
PN	PN			63A6
PN1	PN1			63B6
PTN	PTN			63D6
PTN1	PTN1			63D6
RC1-15	RC1-15			70C8
SO-9	SO-9			71D7
SCK	SCK			65B2
SPT	SPT			67B7
ST00-39		ST00-39		61A1
TBO-9	TBO-9			68E8
TMB		TMB		61A1
TN	TN			63B6
TN1	TN1			63C6
TNK	TNK			70C6
UO-9	UO-9			69D8
UK	UK			62E8
VFO-4	VFO-4			70D6
VGO-11	VGO-11			70B6
W	W			62D8
WF	WF			70C1
WG	WG			70B1
WL	WL			70A1

"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS		LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	
ORIG. REG. MKR. CONN. CKT.	ORIG. REG. MKR. CONN. CKT. MKR. PART	PREF. CONT. CKT. FCR ORIG. REG. MKR. CONN.	
11	11		20B2
	2W		95B8
	4W		95B8
AO,1,2,4,7	AO,1,2,4,7		51-55H1
BO,1,2,4,7	BO,1,2,4,7		51-55H1
	BRL		38C6
BT	BT		38B6
CO,1,2,4,7	CO,1,2,4,7		51-55H1
	CDO,1,2,4,7		94D5
CB		CB	39B5
	CE		96B3
CGA	CGA		7F1
CGB	CGB		7G1
CKG	CKG		37CC
CNR	CNR		28F0
	CPNT		38D6
CR	CR		20C7
	CRUO,1,2,4,7		7F1
CTAO-2	CTAO,1,2,4,7		7B1
CUO,1,2,4,7	CUO,1,2,4,7		7C1
D	D		20F9
D GRD		D GRD	39B5
DO,1,2,4,7	DO,1,2,4,7		51-55H1
EO,1,2,4,7	EO,1,2,4,7		51-55H1
	ECN		63F1
FO,1,2,4,7	FO,1,2,4,7		51-55H1
FAC	FAC		21C2
FTO-3	FTO-3		1B8
FUO,1,2,4,7	FUO,1,2,4,7		1B8
GO,1,2,4,7	GO,1,2,4,7		51-55H1
HO,1,2,4,7	HO,1,2,4,7		51-55H1
HGO,1,2,4,7	HGO,1,2,4,7		1C8
	IT		96F6
JO,1,2,4,7	JO,1,2,4,7		51-55H1
KO,1,2,4,7	KO,1,2,4,7		51-55H1
LO,1,2,4,7	LO,1,2,4,7		51-55H1
LLO,1,2,4,7	LLO,1,2,4,7		33H0
LT	LT		20B2
LT1	LT1		20A3
LT2	LT2		20B1
M7	M7		55H2
MAK		MAK	39A5
MB	MB		39H5
MCK		MCK	39A5
MF	MF		20F9
MON	MON		79C2
MRL	MRL		38C6
MSK		MSK	39A5
NOB	NOB		47C8
OBS	OBS		47C8
	OCN		63F1
OR	OR		21D2
PD	PD		20E7
PK	PK		20D7
PS	PS		20E7
	RG		96E3
RL	RL		38D6
RP	RP		7D1
	RT		96E3
SCK	SCK		20C7
SCN	SCN		20B7

"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS		LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	
INC. REG. MKR. CONN. CKT	INC. REG. MKR. CONN. CKT MKR. PART	PREF. CONT. CKT. FOR INC. REG. MKR. CONN.	
11	11		20C2
2DT	2DT		20D2
	2W		95D8
	4W		95D8
AO,1,2,4,7	AO,1,2,4,7		51-55F1
ACD	ACD		93B1
BO,1,2,4,7	BO,1,2,4,7		51-55F1
	BRL		38D6
BT	BT		38E6
CO,1,2,4,7	CO,1,2,4,7		51-55F1
CDO,1,2,4,7	CDO,1,2,4,7		93E5
	CE		96G3
CB		CB	39B5
CKG	CKG		37C0
	CPNT		38F6
D GRD		D GRD	39B5
DO,1,2,4,7	DO,1,2,4,7		51-55F1
DCK	DCK		23E7
DNC	DNC		93D1
EO,1,2,4,7	EO,1,2,4,7		51-55F1
ECN	ECN		63G1
F	F		23G7
FO,1,2,4,7	FO,1,2,4,7		51-55F1
FC	FC		93D1
FGO,1,2	FGO,1,2		16D1
FVD	FVD		20D2
GO,1,2,4,7	GO,1,2,4,7		51-55F1
HO,1,2,4,7	HO,1,2,4,7		51-55F1
HTO,1,2,4,7	HTO,1,2,4,7		51-55F1
INC	INC		21F2
	IT		96F6
JO,1,2,4,7	JO,1,2,4,7		51-55F1
KO,1,2,4,7	KO,1,2,4,7		51-55F1
LO,1,2,4,7	LO,1,2,4,7		51-55F1
LCDO-2	LCDO-2		93A1
LR	LR		23E7
LT	LT		20C2
M7	M7		55H1
MAK		MAK	39A5
MB	MB		39G5
MCK		MCK	39A5
MON	MON		79D2
MRL	MRL		38F6
MSK		MSK	39A5
OA	OA		20F2
OB	OB		20F2
OCN	OCN		63H1
PCD	PCD		21G2
PCD1	PCD1		21H2
PCR	PCR		21F2
PHC	PHC		20G2
	RG		96F3
RO	RO		21H2
	RT		96F3
SPL	SPL		85E1
SRT	SRT		23F7
TAN	TAN		21E2
TAN1-4	TAN1-4		21C2
TCA	TCA		21H2
TCB	TCB		21H2

"U" TYPE CONNECTORS	WIRE SPRING CONNECTORS		LOCATION
DESIGNATION	DESIGNATION	DESIGNATION	
INC. REG. MKR. CONN. CKT	INC. REG. MKR. CONN. CKT MKR. PART	PREF. CONT. CKT. FOR INC. REG. MKR. CONN.	
TM	TM		39G5
TOL	TOL		21E2
TR2	TR2		22C1
TRK	TRK		22C1
TRL	TRL		38E6
TRS	TRS		22C1
TST	TST		23D7
TT	TT		20C2
TTO,1,2,4,7	TTO,1,2,4,7		51-55F1
UTO,1,2,4,7	UTO,1,2,4,7		51-55F1
VTC	VTC		93C1
WKC	WKC		93E1
X11	X11		20C2

LINE, LINE LINK & CONN. CKT.	LINE LINK CONN. CKT.	PREF. CONT. & MAKE BUSY CKT. FOR LINE LINK CONN.	LOCATION
BS	BS		4A7
BSO,1	BSO,1		4B7
CGA	CGA		6G1
CGB	CGB		6G1
CSO-29	CSO-29		6E1
DTK	DTK		4F7
	ES		97E2
	ESK		97C2
G	G		4G7
HGO-9	HGO-9		6G1
HGK	HGK		6H1
LBO-9	LBO-9		33D3
LCB	LCB		88E6
LFK	LFK		4A7
LHO-4	LHO-4		33D0
LLO-9	LLO-9		33D2
LLF	LLF		79G6
LO	LO		4G7
LOB	LOB		4G7
LOK	LOK		4F7
NT	NT		85B4
OF	OF		88G6
PL	PL		82F6
SMO-9	SMO-9		32E2
STO-39	-		4E7
		STO-59	4B7-4E7
TER	TER		88A3
TMB		TMB	4E7
VO-4	VO-4		6F1
VGBO-11	VGBO-11		6F1



NOTES:
1. PARENTHETICAL NUMBERS INDICATE ORDER OF CONNECTIONS.

2. ARROWS INDICATE DIRECTION OF CONNECTIONS.

FIG. 6
ESTABLISHING DIALING CONNECTION

Card Coordinates	Punch Designation	Functional Meaning and Indication
RO 50	MTO	Minutes Tens The minutes in tens, as received from the master timer or the time-of-day circuit.
51	1	
52	2	
53	4	
54	7	
RO 55	MUO	Minutes Units The minutes in units, as received from the master timer or the time-of-day circuit.
56	1	
57	2	
58	4	
59	7	

u 50R
8 0R
1N
3

DOUBLE SIDED TROUBLE RECORDER CARD

"S" AND "R" RELAYS (FRONT OF CARD)

Note: In addition to the functional meaning and indication of punch designations shown following, reference may be made to Schematic Table 1A (for offices having new Standard Master Test Frame or to Table 1B (for offices which convert for use with double sided trouble recorder card). In these tables in right hand column under "Conn. Ckt." all circuits from which trouble indications originate are shown. All punch indications are shown in the left hand column under "Lead Designation and Trouble Recorder Punch." These punches are shown with the trouble record symbol. In some cases the punch designation does not agree with lead designation. Conn. circuits are shown abbreviated, and titles of circuits are shown in legends for Tables 1A and 1B.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S8 00	TI	Trouble Indication Trouble encountered on a service, monitored, or test call.
S8 01	TST	Test Call Incoming register signals marker that this is a test call.
S8 02	MTPT	Marker-Pretranslator-Subscriber Line Test Trouble record perforated on: a. Marker test call. b. Pretranslator test call. c. Subscriber line test call.
S8 03	ATKT	Automatic Trunk Test Trouble record perforated on an automatic trunk test call.
S8 04	SRT	Sender-Register Test Trouble record perforated on: a. Outgoing sender test call. b. Intermarker group sender test call. c. Originating register test call. d. Incoming register test call.
S8 10	TKT	Trunk Test Trouble record perforated on a trunk test call.
S8 11	M	Monitored The connection is being monitored.
S8 12	MLV	Marker - Line Verification Line verification test in the marker stage. The number group cross connections and the subscriber class of service on the line link frame are checked.
S8 13	LVF	Line Verification Failure Line verification test failure (unsatisfactory test).
S8 14	LVM	Line Verification Match Line verification test match (satisfactory test).
S8 20	MOR	Monitored Originating Register Automatic monitor was connected to an originating register.
S8 21	MIR	Monitored Incoming Register Automatic monitor was connected to an incoming register.

Card Coordinates		Punch Designation	Functional Meaning and Indication
S8	22	MOS	Monitored Outgoing Sender Automatic monitor was connected to an outgoing sender.
S8	23	LIT	Line Insulation Test Trouble record perforated on a line insulation test.
S8	24	PRT	Pretranslator A pretranslator engaged the trouble recorder.
S8	30	MKR	Marker A marker engaged the trouble recorder.
S8	31	TURNOVER	Turn Over A perforation in one of these locations indicates AMA or CAMA trouble record. Read card on reverse side.
S8	32	TURNOVER	
S8	33	TURNOVER	
S8	34-40-44 50-53	DRO-9	Display Registered a. Number of the pretranslator (DRO-2), or the units digit of the number of the marker circuit connected to the trouble recorder (DRO-9). b. On line insulation tests, the number of the marker group with which the line insulation test circuit is associated. The trouble records for several marker groups may be processed at a common test center. Arbitrary numbers are assigned to these groups for identification purposes.
S8	54	DRTO	Display Registered Tens - The tens digit of the number of the marker circuit connected to trouble recorder.
S7	00	ITR	First Trial Check a. Marker connector signals the marker that this is a first trial. b. Pretranslator indicates that this is a first trial.
S7	01	~~2TR~~	Second Trial a. Marker connector signals the marker that this is a second trial. b. Pretranslator indicates that this is a second trial.
S7	02	WT	Work Timer The marker timed out while trying to complete a function or a group of functions.
S7	03	SDT	Short Delay Timer Marker time-out while trying to seize a line link, trunk link, sender group, or number group.
S7	04	LDT	Long Delay Timer Marker time-out while trying to seize a line link, trunk link, sender group, or number group.
S7	10	TRS	Transfer Start Marker start lead in a marker connector or a pretranslator start lead in a pretranslator connector was transferred. This record will not indicate a service call failure, but with the information given elsewhere in the trouble record, will indicate a connector trouble in the normal access paths.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S7 11	TGT	Trunk Guard Test The outgoing sender failed to complete trunk test in the allotted time.
S7 12	FCG	False Cross and Ground Marker FCG relay had operated due to trouble on tip and ring of selected channel prior to line hold magnet operation.
S7 13	LR	Link Release Incoming register link has encountered a trouble condition and the incoming register, after a timing period, has sent a trouble indication to the marker.
S7 14	DCK	Double Connection Check The incoming register DCK (double connection check) relay operated. Absence of this perforation indicates incoming register DCK relay encountered a double connection in the incoming register link and thus failed to operate.
S7 20	GT5	Ground Test Ground test failure on a subscriber line.
S7 21	SQA	Sequence Advance Marker SQA (sequence advance) relay remained operated long enough for SQA1 relay to release (an abnormal length of time), thus indicating a failure in the sequence advance circuit.
S7 22	PSR	Permanent Signal Record A permanent signal caused the trouble record to be taken after the marker has made linkage check.
S7 23	MLF	Mixed Line Frame Line link frame originating this connection serves both dial pulse and multifrequency pulse subscribers. The MLF perforation will be accompanied by either the D or MF perforation.
S7 24	D	Dial Pulse Frame Line link frame originating this connection serves only subscriber sets equipped with dials.
S7 30	MF	Multifrequency Pulse Frame Line link frame originating this connection serves only subscriber sets equipped for multifrequency key pulsing.
S7 31	ITR	Intraoffice Marker establishing an intraoffice trunk connection.
S7 32	SOG	Subscriber Outgoing Marker establishing an outgoing trunk connection.
S7 33	TER	Terminating Marker establishing an incoming trunk connection.
S7 34	TOG	Toll-Tandem Outgoing Marker establishing a toll or a tandem trunk connection.
S7 40	RV	Revertive Marker establishing a reverting trunk connection.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S7 41	CAMA	Call being served by marker requires a CAMA sender.
S7 42		Unassigned
S7 43	ROA	Reorder Marker received reorder indication.
S7 44	FLG	First Linkage Ground Marker is ready to set up the terminating stage of an intraoffice trunk connection or is ready to set up the linkage on an incoming trunk connection, thus in both cases it is ready to seize the number group. Also operated on a tandem or toll trunk connection.
S7 50	SCB	Start Call Back Marker is establishing the originating stage of an intraoffice trunk connection.
S7 51	NSO	No Sender Outgoing Outgoing trunk connection not requiring a sender.
S7 52	NSI	No Sender Intraoffice Intraoffice trunk connection not requiring a sender.
S7 53	SON	Sender Outgoing Outgoing trunk connection requiring a sender or an intraoffice trunk connection with AMA requiring a sender.
S7 54	DRT1	Display Registered Tens The tens digit of the number of the marker circuit connected to the trouble recorder.
S6 00	RPB	Register Preference Basic Incoming trunk appears on the basic or the associated supplementary incoming register link frame.
S6 01	RPAB	Register Preference Auxiliary Basic Incoming trunk appears on the first auxiliary basic or the associated supplementary incoming register link frame.
S6 02	RPSA	Register Preference Second Auxiliary Incoming trunk appears on the second auxiliary basic or the associated supplementary incoming register link frame.
S6 03 04 10-12	RPO-4	Register Preference Trunk preference for incoming register in a selected horizontal link group.
S6 13	LB	Line Busy Called line found busy for an intraoffice or incoming trunk connection.
S6 14	FM	Failure to Match Functional failure of the marker to find an idle channel in available subgroups after permissible retesting.
S6 20	RCY	Recycle Functional failure of the marker during an attempt to recycle because of: a. Subscriber line, other than PBX, on a plugged-up basis. b. Made-busy line link frame on toll trunk connection. c. Failure to match.

Card Coordinates	Designation	Functional Meaning and Indication
S6 21	RA	Route Advance Marker had prepared for route advancing.
S6 22	PRCY	Marker Recycle on PBX Connection The marker RCY2 relay has operated indicating a marker recycle on a PBX Connection.
S6 23		Unassigned
S6 24		Unassigned
S6 30		Unassigned
S6 31		Unassigned
S6 32	AMA	Automatic Message Accounting Operation of the AMA relay in the outgoing sender for AMA functions.
S6 33		Unassigned
S6 34		Unassigned
S6 40	CM3	Call Marker After Three Digits If perforated alone, the pretranslator signaled the register to call the marker after three digits and not to return the coin on coin lines. If accompanied by the SD perforation, the register is to call the marker after three digits, but before doing so, to return the coin on coin lines.
S6 41 S6 42 S6 43	CMA CMB CMC	Call Marker Start - Indexes A, B and C The pretranslator signals the originating register when to call the marker. This may represent any number of digits, as determined by the originating register cross connections.
S6 44	SD	Stations Delay a. Pretranslator set the originating register for stations delay when either CMA, CMB, or CMC is perforated. b. Pretranslator signals the originating register to return the coin on coin lines when CM3 is perforated.
S6 50	PCK	Pretranslator Connector Check Pretranslator connector was attached.
S6 51	PRL	Pretranslator Release Pretranslator signaled the originating register to release.
S6 52	RLK	Release Check (Pretranslator Function) Release relay in the originating register operated; also used for a trouble release.
S6 53	PTR	Pretranslator Connector Second Trial Pretranslator signaled pretranslator connector to make a second trial.
S6 54	XX	Cross Detection Operation of a cross-detecting relay within the pretranslator circuit.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S5 00, 01	FRO, 1	Connector Frame a. The incoming register marker connector frame number. b. The originating register marker connector frame number. c. The line link marker connector frame number. d. The pretranslator connector frame number.
S5 02	FR2	Connector Frame a. The originating register marker connector frame number. b. The line link marker connector frame number. c. The pretranslator connector frame number.
S5 03,04 10-14	FR3-9	Connector Frame Line link marker connector frame number.
S5 20-22	CNO-2	Connector Number a. Connector number of following frames: line link marker connector, originating register marker connector, incoming register marker connector. b. The originating register subgroup on a pretranslator trouble record.
S5 23	CN3	Connector Number Connector number of the following frames: line link marker connector, originating register marker connector, incoming register marker connector.
S5 24		Unassigned
S5 30 31 32 33 34	HTO 1 2 4 7	Trunk Hundreds HT- (hundreds trunk) lead grounded by the incoming register to aid the marker in locating the line appearance of this tandem or toll trunk for the completion of the call.
S5 40 41 42 43 44	TTO 1 2 4 7	Trunk Tens The TT- (tens trunk) lead grounded by the incoming register to aid the marker in locating the line link appearance of this tandem or toll trunk for the completion of the call.
S5 50 51 52 53 54	UTO 1 2 4 7	Trunk Units The UT- (units trunk) lead grounded by the incoming register to aid the marker in locating the line link appearance of this tandem or toll trunk for the completion of the call.
S4 00-04 10-14 20-24 30-34	CN-RG- 0-19	Connector-Register a. LLMC number. b. The position of a register in the originating register marker connector. c. The position of a register in the incoming register marker connector. d. The originating register position in the subgroup in a pretranslator connector.
S4 40-43	RG20-23	The originating register position in the subgroup in a pretranslator connector.
S4 44		Unassigned

Card Coordinates	Punch Designation	Functional Meaning and Indication
S4 50-52	FGO-2	Trunk Link Frame - Tens Ground on an FG- (trunk frame group) lead from the incoming register provides the trunk link frame tens identification. (Equipped when there are more than ten trunk link frames.)
S4 53	ECN	Even Connector Even-numbered marker connector is associated with the incoming register. This steers the marker to a preferred number group to obtain the equipment location of a tandem or toll incoming trunk.
S4 54	OCN	Odd Connector Odd-numbered marker connector is associated with the incoming register. This steers the marker to a preferred number group to obtain the equipment location of a tandem or toll incoming trunk.
S3 00	LT	Local Translator a. A register has directed the marker to employ its local translator for this connection. b. The pretranslator signals the register that the translation is for a home area code. (LT is always perforated on pretranslator trouble records if LT and 11X relays are not equipped in the pretranslator).
S3 01	TT	Toll Translator A register has directed the marker to employ its toll translator for this connection.
S3 02	2DT	Two-digit Translator On incoming calls, the office code transmitted to the marker is the last two digits of a 3-digit code where the first digit of the 3-digit code has been absorbed by the originating office.
S3 03	FVD	Five-digit Translator A register has directed the marker to employ its 5-digit translator for this connection.
S3 04	X11	Service Code Translator Register has directed the marker to employ its service code translator for this connection.
S3 10	11	11 Translator a. A register has directed marker to employ its 11 translator for this connection. b. A pretranslator signals the register that the translation is for a directing code.
S3 11	OA	Office "A" On an incoming trunk connection, the office unit to which a marker is to complete the connection.
S3 12	OB	Office "B" On an incoming trunk connection, the office unit to which a marker is to complete the connection.
S3 13	PHC	Physical Office The incoming register directed the marker to complete the connection to the physical subdivision of the directory number series for an office unit.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S3 14	THC	Theoretical Office The incoming register directed the marker to complete the connection to the theoretical subdivision of the directory number series for an office unit.
S3 20	OR	Originating The originating marker connector notified the marker that this is an originating connection.
S3 21	FAC	Direct Distance Dialing Call Originating register informed the marker that it is handling a direct distance dialing call.
S3 22	INC	Local Incoming Incoming register notified the marker that this connection is from an incoming trunk.
S3 23	TAN	Tandem The incoming register notified the marker that this connection is from a tandem trunk.
S3 24	TOL	Toll The incoming register notified the marker that this connection is from a toll trunk.
S3 30	PCR	Pulse Conversion - Revertive Incoming register has signaled the marker that it is serving a PCR class of trunk which requires revertive outpulsing with the aid of a revertive pulse outgoing sender.
S3 31	PCD	Pulse Conversion - Dial Incoming register has signaled the marker that it is serving a PCD class of trunk which requires dial outpulsing with the aid of a dial pulse outgoing sender in one group.
S3 32	PCD1	Pulse Conversion - Dial Incoming register has signaled the marker that it is serving a PCD class of trunk which requires dial outpulsing with the aid of a dial pulse outgoing sender in a second group.
S3 33	CAMF	CAMA Function a. With "CAMA" punch, indicates that the call is a CAMA function call. b. With "TOG" punch, indicates a through switched call entering over a CAMA incoming trunk.
S3 34	CAMS	CAMA Second Usage Indicates that the call is a CAMA completing function.
S3 40		Unassigned
S3 41		Unassigned
S3 42		Unassigned
S3 43		Unassigned
S3 44	RO	Reorder Incoming register signaled the marker for a reorder (overflow) signal.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S3 50-54	TFO 1 2 4 7	Trunk Link Frame - Units Ground on TF- (trunk frame units) leads from the incoming register provides the trunk link frame units identification.
S2 00	PS	Permanent Signal Originating register signals the marker to select a permanent signal route due to failure to start dialing in the allotted time.
S2 01	PD	Partial Dial Originating register signals the marker to select a partial dial route due to failure to complete dialing in the allotted time.
S2 02	PK	Partial Dial and Permanent Signal Check Originating register signals the marker that the dialing functions were completed in the allotted time.
S2 03	CR	Coin Returned Originating register signals the marker that the coin was satisfactorily returned.
S2 04	SCN	Stuck Coin Originating register signals the marker that the coin failed to return.
S2 10	SCK	Stuck Coin Check Originating register signals the marker that there is no stuck coin or coin return failure.
S2 11	CNR	Coin Return Marker signals the originating register to return the coin.
S2 12	MAN	Manual Marker has received the class-of-service group of a calling line and proceeds to signal the originating register, on a dial tone connection, that this is a manual class of call. This causes the register to cancel dial tone and immediately reseize a marker and request an operator trunk.
S2 13	2P	Two-party Marker has received the class-of-service group of a calling line and proceeds to signal the originating register, on dial tone connection, that this is a 2-party class call and thus the register is to make the party identification test.
S2 14	TOBS OBS1	Trunk Observed (TOBS) Call may be trunk observed. Service Observation 1 (OBS1) Marker received a service observation indication from the service observing circuit on a dial tone connection.
S2 20	TOB OBS2	Trunk Observed (TOB) Call is being trunk observed. Service Observation 2 (OBS2) Marker passed the service observation indication on to the originating register.

Card Coordinates	Punch Designation	Functional Meaning and Indication
S2 21	OBS	Observed a. Originating register signals the marker that this call is up on service observation. b. Outgoing sender signals the transverter that this call is up on service observation.
S2 22	NOB	Nonobserved a. Originating register signals the marker that this call is not up on service observation. b. Outgoing sender signals the transverter that this call is not up on service observation.
S2 23 S2 24		Unassigned
S2 30 31 32 33 34	ARO/HT'0 1 1 2 2 4 4 7 7	Arbitrary Digit (ARO, 1,2,4,7) - Hundreds Trunk (HT'0,1,2,4,7) a. Marker transmitted to the outgoing sender (DP) an arbitrary digit for outpulsing. b. Marker transmitted arbitrary digit information to the monitor and master test control. This is for DP senders only. Hundreds Trunk (HT'0,1,2,4,7) Hundreds trunk information transmitted to CAMA sender by marker to identify line appearance of CAMA trunk.
S2 40 41 42 43 44	BRO/TT'0 1 1 2 2 4 4 7 7	Arbitrary Digit (BRO,1,2,4,7) - Tens Trunk (TT'0,1, 2,4,7) a. Marker transmitted to the outgoing sender an arbitrary digit for outpulsing. b. Marker transmitted arbitrary digit information to the monitor for DP senders only. c. Number outpulsed by sender for arbitrary B digit on monitored or test calls and a failure to check occurred. Tens Trunk (TT'0,1,2,4,7) Tens trunk information transmitted to CAMA sender by marker to identify line appearance of CAMA trunk.
S2 50 51 52 53 54	CRO/UT'0 1 1 2 2 4 4 7 7	Compensating Resistance - Arbitrary Digit (CRO,1,2,4,7 a. Marker transmits to the outgoing sender (RP and PCI) the compensating resistance required for outgoing trunks. b. Marker transmits to the outgoing sender (DP and MF) an arbitrary digit for outpulsing. c. Marker transmits to the monitor the arbitrary digit and compensating resistance information. d. Number pulsed by sender for arbitrary C digit on monitored or test calls and a failure to check occurred. Units Trunk (UT'0,1,2,4,7) Units trunk information transmitted to CAMA sender by marker to identify line appearance of CAMA trunk.
S1 00 01 02 03 04	A0 1 2 4 7	A Digit a. The A code digit registered within the marker by a register. b. The A code digit transmitted from marker to monitor. c. The A code digit registered within the pretranslator.
S1 10 11 12 13 14	B0 1 2 4 7	B Digit Same as for A digit.

Card Coordinates		Punch Designation	Functional Meaning and Indication
S1	20	C0	C Digit Same as for A digit. The C digit will appear on trouble record cards in 2-digit offices, although not recorded by the pretranslator.
	21	1	
	22	2	
	23	4	
	24	7	
S1	30	D0	D Digit Same as for A digit, excluding c.
	31	1	
	32	2	
	33	4	
	34	7	
S1	40	E0	E Digit Same as for A digit, excluding c.
	41	1	
	42	2	
	43	4	
	44	7	
S1	50	F0	F Digit Same as for A digit, excluding c.
	51	1	
	52	2	
	53	4	
	54	7	
S0	00	A'0	A' Digit a. The A code digit passed by the marker to an outgoing sender. b. The A code digit registered in the monitor by monitoring on pulsing leads of either originating or incoming register or outgoing sender.
	01	1	
	02	2	
	03	4	
	04	7	
S0	10	B'0	B' Digit Same as for A' digit.
	11	1	
	12	2	
	13	4	
	14	7	
S0	20	C'0	C' Digit Same as for A' digit.
	21	1	
	22	2	
	23	4	
	24	7	
S0	30	D'0	D' Digit Same as for A' digit.
	31	1	
	32	2	
	33	4	
	34	7	
S0	40	E'0	E' Digit Same as for A' digit.
	41	1	
	42	2	
	43	4	
	44	7	
S0	50	F'0	F' Digit Same as for A' digit.
	51	1	
	52	2	
	53	4	
	54	7	
R8	00	G0	G Digit a. The G code digit registered in the marker by a register. b. The G code digit transmitted to the monitor by the marker.
	01	1	
	02	2	
	03	4	
	04	7	

Card Coordinates	Punch Designation	Functional Meaning and Indication
R8 10	H0	H Digit Same as for G digit.
11	1	
12	2	
13	4	
14	7	
R8 20	J0	J Digit Same as for G digit.
21	1	
22	2	
23	4	
24	7	
R8 30	K0	K Digit Same as for G digit.
31	1	
32	2	
33	4	
34	7	
R8 40	L0	L Digit Same as for G digit.
41	1	
42	2	
43	4	
44	7	
R8 50	M7	Maximum Digits The last digit of a maximum of eleven digits was registered in the incoming or originating register.
R8 51	M11	Monitor 11 Prefix The monitor had a 11 prefix registered from either a monitored sender or register. This is to be matched in the monitor with the 11 prefix signal from the marker when a register is monitored or the CL1 signal when a sender is monitored.
R8 52		Unassigned
53		
54		
R7 00	G'0	G' Digit a. The G code digit transmitted to the outgoing sender by the marker. b. The G code digit registered in the monitor by monitoring on the pulsing leads of either an outgoing sender, originating or incoming register.
01	1	
02	2	
03	4	
04	7	
R7 10	H'0	H' Digit Same as for G' digit.
11	1	
12	2	
13	4	
14	7	
R7 20	J'0	J' Digit Same as for G' digit.
21	1	
22	2	
23	4	
24	7	

Card Coordinates	Punch Designation	Functional Meaning and Indication
R7 30 31 32 33 34	K'0 1 2 4 7	K' Digit Same as for G' digit.
R7 40 41 42 43 44	L'0 1 2 4 7	L' Digit Same as for G' digit.
R7 50	M'7	Maximum Digits The marker signaled the completion of called number registration, which consisted of eleven digits from a register to the sender.
R7 51	M11	Monitor 11 Prefix The monitor had a 11 prefix registered from either a monitored sender or register. This is to be matched in the monitor with the 11 prefix signal from the marker when a register is monitored or the CL1 signal when a sender is monitored.
R7 52-54		Unassigned
R6 00-04	GS1-5	Ground Supply The ground supply progress position of the marker at time of trouble indication.
R6 10	FAA	Foreign Area "A" Foreign area translator "A" was associated with marker when trouble record was taken.
R6 11	FAB	Foreign Area "B" Foreign area translator "B" was associated with marker when trouble record was taken.
R6 12	AL	Allotment The operation of one of the ALO-3 (allotted groups) relays in the marker showing use of an allotted. trunk or sender group.
R6 13	GPA	Group Preference A The marker selected the subgroup A trunks or senders in an allotted group.
R6 14	GPB	Group Preference B The marker selected the subgroup B trunks or senders in an allotted group.
R6 20	TWT	Two-way Trunk Route A TWTO-2 (2 way trunk) relay was operated in the marker for 2-way trunk operation.
R6 21	OPR	Operator Route The marker routed the call to an operator.
R6 22	CNS	Coin Service The call is a coin class.
R6 23	DR	Denied Route A DRO-2 (denied route) relay was operated in the marker for denied service reroute.
R6 24, 30, 31	CRRO-2	Coin Zone Reroute A marker CR- (coin zone reroute) relay was operated for rerouting a coin class of a call to an operator.
R6 32		Unassigned
R6 33, 34 40 - 42	RTO-4	Route Transfer An RT (Route Transfer) relay is operated at the master test frame in order to transfer a regular route to an alternate route.

Card Coordinates	Punch Designation	Functional Meaning and Indication
R6 43		Unassigned
R6 44	TC	Talking Charge The marker operated its TC relay and grounded the TC or RC lead to the selected trunk.
R6 50	CN	Coin Call The marker recognizes this as a coin call and proceeds to operate the CN relay in the selected trunk.
R6 51	TP	Tip Party The originating register signaled the marker that this is a tip party call.
R6 52	TP'	Tip Party Prime - Incoming Trunk Ringing Switch Hold Magnet a. The marker operated the proper class relay in the selected trunk. b. The marker operates TP relay in register-sender for AMA information on tip party calls. c. The marker operates the ringing switch hold magnet associated with the incoming trunk.
R6 53	RP	Ring Party The originating register signaled the marker that this is a ring party call.
R6 54	RPK	Ring Party Check a. The marker operated its RP relay and grounded the RP lead to the selected trunk. b. The marker operates RP relay in AMA sender for ring party calls.
R5 00-04	FRO-4	Sender Connector Frame The number of the outgoing sender connector frame.
R5 10,11	CNO,1	Connector Number a. Particular connector number (letter) in the outgoing sender connector frame. (0 corresponds to A; 1 corresponds to B). b. Particular connector number in outgoing sender connector frame.
R5 12,13	CN2,3	Connector Number Particular connector number in outgoing sender connector frame.
R5 14	SO	Sender Position of the particular sender in the outgoing sender connector.
R5 20-24 30-33	S1-9	Sender a. Position of the particular sender in the outgoing sender connector. b. Indicates the type of test and the range used on line insulation tests.
R5 34,40-43	S10-14	Sender Position of the particular sender in the outgoing sender connector.
R5 44		Unassigned
R5 50	NT-ORCO	No Test (NT) - Originating Rate Class (ORCO) Incoming trunk signals the marker that this call is to be a no test connection. Originating Rate Class (ORCO) Calling customer originating rate class (O) indication to marker from trunk link frame.

Card Coordinates	Punch Designation	Functional Meaning and Indication
R5 51	NN-ORC1	Non-No Test (NN) - Originating Rate Class (ORC1) Incoming trunk signals the marker that there is a regular test incoming trunk arranged for PBX hunting.
		Originating Rate Class (ORC1) Calling customer originating rate class (1) indication to marker from trunk link frame.
R5 52	HF-ORC2	Originating Rate Class (2) Calling customer originating rate class (2) indication to marker from trunk link frame. HF lead is used from marker to transmit ORC2 indication.
R5 53	NH	No Hunt The incoming trunk signals the marker that there is to be no PBX hunting on this call.
R5 54	SPL	Special Incoming register signals that this is a no-test or no-hunt call requiring a special marker.
R4 00-04 10-14 20,21	OSGO-11	Outgoing Sender Group Outgoing sender group selected by the marker.
R4 22	SSA	Sender Subgroup A Outgoing sender subgroup A was seized by the marker.
R4 23	SSB	Sender Subgroup B Outgoing sender subgroup B was seized by the marker.
R4 24,30-33	OSO-4	Outgoing Sender Selection Idle sender within the selected subgroup.
R4 34		Unassigned
R4 40	RO'	Reorder Operation of the RO (Reorder) relay in the outgoing sender to set the outgoing trunk for reorder.
R4 41-44		Unassigned
R4 50 51 52	ORC'0 1 2	Originating Rate Class Calling customer originating rate class indication to CAMA sender.
R4 53	NTT	No-test Train Marker uses a no-test linkage to complete this connection.
R4 54	MPT	Message Potential Test MPT (message potential test) relay in the marker operated due to a message registration taking place while the marker was making a line sleeve potential check prior to establishing a no-test connection.
R3 00	RN-SPC-ITC 0	Recorder Number - Sender Pulsing Class - Incoming Class a. AMA recorder (0) associated with intraoffice or outgoing trunk. b. Sender pulsing class (pulse conversion calls): 1) DP to tandem or nonlink-type SXS over any one-way trunk except intertoll. 2) RP to No. 1 crossbar of panel (battery cutoff, repeated incoming ground cutoff) over any one-way trunk. c. Incoming trunk class (NN - no numbers in this marker group).

Card Coordinates	Punch Designation	Functional Meaning and Indication
R3 01	RN-SPC-ITC 1	Recorder Number - Sender Pulsing Class - Incoming Class a. AMA recorder (1) associated with intraoffice or outgoing trunk. b. Incoming trunk class (SE - supervision, EN number). c. Incoming trunk class (TB - toll, physical and theoretical).
R3 02	RN-SPC-ITC 2	Recorder Number - Sender Pulsing Class - Incoming Class a. AMA recorder (2) associated with intraoffice or outgoing trunk. b. Sender pulsing class (pulse conversion calls): 1) DP to nonlink-type SXS local or tandem, sender-type or link-type CDOs over any one-way IT or 2-way trunk. c. Incoming trunk class (SA - supervision, nondiscriminating numbers). d. Incoming trunk class (MB - manual, physical and theoretical).
R3 03	RN-SPC-ITC 3	Recorder Number - Sender Pulsing Class - Incoming Class a. AMA recorder (3) associated with intraoffice or outgoing trunk. b. Sender pulsing class (pulse conversion calls): 1) DP to sender-type local or tandem over any one-way trunk except IT. 2) RP to panel ground incoming without repeating incoming over any one-way trunk. c. Incoming trunk class (NA - no supervision, nondiscriminating numbers). d. Incoming trunk class (FB - full selector, physical and theoretical).
R3 04	RN-ITC-SPC 4	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (4) associated with intraoffice or outgoing trunk. b. Incoming trunk class (NE - no supervision, extra-theoretical). c. Incoming trunk class (TT - toll, theoretical).
R3 10	RN-ITC-SPC 5	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (5) associated with intraoffice or outgoing trunk. b. Incoming trunk class (ST - supervision, theoretical). c. Incoming trunk class (MT - manual, theoretical). d. Sender pulsing class. Battery-ground pulsing to nonlink-type SXS (local or tandem).
R3 11	RN-ITC-SPC 6	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (6) associated with intraoffice or outgoing trunk. b. Incoming trunk class (NT - no supervision, theoretical). c. Incoming trunk class (FT - full selector, theoretical).

Card Coordinates	Punch Designation	Functional Meaning and Indication
R3 12	RN-ITC-SPC 7	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (7) associated with intraoffice or outgoing trunk. b. Incoming trunk class (TP - toll, physical).
R3 13	RN-ITC-SPC 8	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (8) associated with intraoffice or outgoing trunk. b. Incoming trunk class (SP - supervision, physical). c. Incoming trunk class (MP - manual, physical).
R3 14	RN-ITC-SPC 9	Recorder Number - Incoming Class - Sender Pulsing Class a. AMA recorder (9) associated with intraoffice or outgoing trunks. b. Incoming trunk class (NP - no supervision, physical). c. Incoming trunk class (FP - full selector, physical).
R3 20	OD-RNTO	Operator Identification (OD) Recorder Number Tens (RNTO) Indication from trunk link frame that calling customer must be identified by operator. Recorder Number Tens (RNTO) Tens number of recorder. Recorder tens number in offices having more than 10 recorders. Transmitted over OD lead from marker.
R3 21	AD-RNT1	Automatic Identification (AD) Recorder Number Tens (RNT1) Indication from trunk link frame that calling customer can be automatically identified. Recorder Number Tens (RNT1) Tens number of recorder. Recorder tens number in offices having more than 10 recorders. Transmitted over AD lead.
R3 22	OD'-RNT'0	Operator Identification (OD') Recorder Number Tens (RNT'0) Indication to CAMA sender that calling customer must be identified by operator. Recorder Number Tens (RNT'0) Tens number of recorder. Indication to sender of recorder tens number. Transmitted over OD' lead from marker.
R3 23	AD'-RNT'1	Automatic Identification (AD') Recorder Number Tens (RNT'1) Indication to sender that calling customer can be automatically identified. Recorder Number Tens (RNT'1) Tens number of recorder. Indication to sender of recorder tens number. Punch indication transmitted over AD' lead from marker.
R3 24	LST	Lettered Stations Operation of the LST (four digits plus lettered stations) relay in the outgoing sender for AMA functions.

Card Coordinates	Punch Designation	Functional Meaning and Indication
R3 30	L5D	Lettered Stations or Five Digits Operation of the L5D (lettered stations or five digits) relay in the outgoing sender for AMA functions.
R3 31	4DG	Four Digits Maximum Operation of the 4DG (four digits maximum) relay in the outgoing sender for AMA Functions.
R3 32	5DG	Five Digits Only Operation of the 5DG (five digits, no letters) relay in the outgoing sender for AMA functions.
R3 33	SC	Service Call Operation of the SC (service call) relay in the outgoing sender for AMA functions.
R3 34	TVT	Transverter Test Operation of the TVT (transverter test) relay in the outgoing sender for AMA functions.
R3 40	OBS'	Observation Operation of the OBS (observation) relay in the outgoing sender for AMA functions (forces a 4-line entry).
R3 41	NOB'	No Observation Operation of the NOB (no observation) relay in the outgoing sender for AMA functions.
R3 42-44	LCDO-2	Local Code Dialed Call being served has seven digits.
R3 50	ACD	Area Code Dialed Call being served has ten digits.
R3 51	VTC	Vacant Terminating Code Indication to marker that call contains a vacant terminating code.
R3 52	DNC	Denied Code Indication to marker that the call contains a denied code.
R3 53	FC	Free Code Indication to the marker that the call contains a free code.
R3 54	WKC	Working Code Indication to marker that the call contains a working code.
R2 00 01 02 03 04	CPO 1 2 4 7	Code Pattern The called party area as transmitted from marker to sender for AMA functions.
R2 10 11 12 13 14	MBO 1 2 4 7	Message Billing Index The message billing index as transmitted from marker to sender for AMA functions.

Card Coordinates		Punch Designation	Functional Meaning and Indication
R2	20	RNO	Recorder Number The number of the AMA recorder associated with a selected trunk, as transmitted from marker to sender.
	21	1	
	22	2	
	23	4	
	24	7	
R2	30	DL1	Deletion a. The DL- (delete) relay operated in the sender by the marker to inform the sender what digital information is to be deleted from outpulsing. The number of digits to be deleted corresponds to the DL- relay operated, starting with the A digit. b. The DL- (delete) relay operated in the monitor by the marker for checking sender performance when deletion is required.
	31	2	
	32	3	
	33	4	
	34	5	
	40	6	
R2	41	CL1	Class 1 The marker indicates: a. To DP and MF senders, that a 11 prefix is to be outpulsed. b. To RP senders, that the call is to a No. 1 crossbar office. c. To monitor, the information is either line a or b, above.
R2	42	CL2	Class 2 The marker indicates: a. To DP sender, that the call is to a community dial office or is a toll call or over a 2-way trunk. b. To RP sender, that the call is to a 2-digit office in a 2- and 3-digit area. c. To PCI sender, that the call is to an office with no numbers above 9999. d. To MF sender, that this is a local call with a 2-way trunk or toll call; thus the sender gives immediate trunk closure. e. To monitor, the information in one of the lines a through d, above.
R2	43	CL3	Class 3 The marker indicates: a. To DP sender, to delay dialing until a start signal is received from the distant office. b. To RP sender, that the call is to a non-repeating incoming panel ground cutoff office and thus a marginal trunk test is required. c. To PCI senders, that the call is to an office with numbers above 9999. d. To monitor, the information in one of the lines a through c, above.
R2	44	CL4	Class 4 The marker indicates: a. To DP sender, that 22 pps dialing is to be used. No indication means 10 pps is to be used. b. To RP sender, that a five (5) should be added to incoming group selection. c. To monitor, the information in either line a or b above.
R2	50	CL5	Class 5 The marker signals: a. The DP sender, that battery-ground pulsing is required. No indication means dialing on a loop basis. b. The automatic monitor, the above information.

Card Coordinates		Punch Designation	Functional Meaning and Indication
R2	51	CL6	Class 6 The marker signals: a. Subscriber access to CX intertoll or CX 2-way trunks. b. The automatic monitor, the above information.
R2	52-54		Unassigned
R1	00	FT0	Frame Tens The FT- (frame tens) of the line link frame associated with the calling line as registered in the marker or monitor.
	01	1	
	02	2	
	03	3	
R1	04	FU0	Frame Units The FU- (frame units) of the line link frame associated with the calling line as registered in the marker or monitor.
	10	1	
	11	2	
	12	4	
	13	7	
R1	14	VG0	Vertical Group The VG- (vertical group) of the calling line as registered in the marker or monitor.
	20	1	
	21	2	
	22	4	
	23	7	
	24	10	
R1	30	HG-0	Horizontal Group The HG- (horizontal group) of the calling line as registered in the marker or monitor.
	31	1	
	32	2	
	33	4	
	34	7	
R1	40	VF0	Vertical File The VF- (vertical file) of the calling line as registered in the marker or monitor.
	41	1	
	42	2	
	43	3	
	44	4	
R1	50	CT0	Class Tens The CT- (class tens) of the calling line class of service as registered in the marker.
	51	1	
	52	2	
R1	53	CGA	Class Group A In conjunction with the CS-, or CT- and CU- punches, identifies the class of service as being within the first 30 classes of service.
R1	54	CGB	Class Group B In conjunction with the CS-, or CT- and CU- punches, identifies the class of service as being within the second 30 classes of service.
R0	00	FT'0-FG'0	Frame Tens Prime (FT'0-3) Trunk Frame Tens (FG'0,1,2) The FT- (frame tens) of the line link frame associated with the calling line, as transmitted by the marker to originating register or AMA sender. Trunk Link Frame Tens (FG'0,1,2) Trunk frame tens information transmitted to CAMA sender to identify trunk frame appearance of CAMA trunk.
	01	1 1	
	02	2 2	
	03	3	

Card Coordinates	Punch Designation	Functional Meaning and Indication
RO 04	FU'0-TF'0	Frame Units Prime (FU'0,1,2,4,7) Trunk Frame Units (TF'0,1,2,4,7) The FU- (frame units) of the line link frame associated with the calling line, as transmitted by the marker to originating register or AMA sender. Trunk Frame Units (TF'0,1,2,4,7) Trunk frame units information transmitted to CAMA sender to identify trunk frame appearance of CAMA trunk.
10	1 1	
11	2 2	
12	4 4	
13	7 7	
RO 14	VG'0	Vertical Group Prime The VG- (vertical group) of the calling line, as transmitted by the marker to originating register or AMA sender.
20	1	
21	2	
22	4	
23	7	
24	10	
RO 30	HG'0	Horizontal Group Prime The HG- (horizontal group) of the calling line, as transmitted by the marker to originating register or AMA sender.
31	1	
32	2	
33	4	
34	7	
RO 40	VF'0	Vertical File Prime The VF- (vertical file) of the calling line, as transmitted by the marker to originating register or AMA sender.
41	1	
42	2	
43	3	
44	4	
RO 50	CU'0	Class Units The CU- (class units) of the calling subscriber's class of service, as registered in the marker.
51	1	
52	2	
53	4	
54	7	

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DOUBLE SIDED TROUBLE RECORDER CARD (FRONT)

(SA AND RA RELAYS)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA8 00	TM	Timing Closure a. TM (Timing) lead grounded by a marker connector to which the marker is connected. b. TM lead grounded by released MSK/MCK/MAK relays in the marker, indicating a marker connector is attempting to seize this marker or the preference chain through the MSK, MCK, MAK relays is open.
SA8 01	CKG	Check Ground Closure CKG2 (connector check ground) relay in the marker has operated. Check ground is closed from marker connector relays to provide off-normal grounds and remove certain standing tests.
SA8 02	TC1	Traffic Control 1 Marker assumed control of line link marker connector.
SA8 03	NE	Number End One of the N1A/N2A/N3A/N4A (number translator cut-in auxiliary) relays in the marker operated on an incoming or intraoffice trunk connection. These relays are operated for number group translation of the called number.
SA8 04	TRN	Trunk Number Identification The TRN (trunk number) relay in the marker, operated to pass the trunk number (numerical digits) into the number group for a tandem or toll trunk connection.
SA8 10	GTL	Ground Transmitting Leads GTL (ground transmitting lead) relay in the marker functions to apply ground on transmitting leads to registers or senders.
SA8 11	TSE	Trunk Selection End None of the marker TS0-19 (trunk selection) relays operated to indicate that a trunk was selected.
SA8 12	FCK	Frame Connector Check The cut-in relay of a selected route operated, thus closing the test leads to the trunk link connector frames serving this route.
SA8 13	FTCK	Frame Test Check Trunk link frames have been tested for presence of an idle trunk or originating register and at least one frame has an idle trunk or register of the desired route.
SA8 14	SNK	Selection Normal Check If not perforated, the marker released the selections made before a recycle takes place.
SA8 20	CK	Check Marker preference (MP or E) relay on the selected trunk link frame operated.
SA8 21	FML	Frame Memory Lock FML (frame memory lock for trunk link connector) relay in the marker operated to insure a different order of trunk link frame preference for succeeding marker usage.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA8 22	MAK1	Marker Connector Cut-in Both halves of the MCA (marker cut-in) relay in the selected trunk link connector operated.
SA8 23	TBK	Trunk Block Check A TB- (trunk block) relay of the selected trunk link connector operated.
SA8 24	RK1-ORK	Registration Check 1 (RK1) Registers Check (ORK) No false ground on calling line identification integrity path. Registers Check (ORK) Registers called number checked.
SA8 30	RK2	Registration Check 2 No false battery on calling line identification integrity path. The operation of RK1 and RK2 relays in the marker is a check that all the information that is to be forwarded to the originating register has been transmitted.
SA8 31	VTK1	Vertical Group Test Check Only one VGTO-11 relay is locked operated in the marker for vertical group selection.
SA8 32	HTK1	Horizontal Group Test Check Only one marker HGTO-9 relay is locked operated for horizontal group selection.
SA8 33	FTK1	Vertical File Test Check Only one marker VFTO-4 relay is locked operated for vertical file selection.
SA8 34	LFK	Line Link Frame Check Associated MCA (marker cut-in) relay operated on the selected line link frame.
SA8 40	DTK	Dial Tone Check DT (dial tone) relay in the line link connector has operated.
SA8 41	FAK	Frame "A" Appearance Check FA- (A appearance) relay in the trunk link frame operated showing the selected trunk has an "A" appearance location in the selected trunk link frame.
SA8 42	FBK	Frame "B" Appearance Check FB- (B appearance) relay in the trunk link frame operated showing the selected trunk has a "B" appearance location in the selected trunk link frame.
SA8 43	LCK	Link Connector Check LC- (link cut-in) relay in the selected trunk link connector had operated.
SA8 44	RK3	Registration Check 3 RK3 relay in the marker has operated to show that all necessary information has been forwarded and is locked into the originating register. With the RK1 and RK2 punched, an absence of the RK3 indicates that the check of locking path in register is incomplete.
SA8 50	HGK	Horizontal Group Check One of the HGO-9 relays on associated line link frame operated.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA8 51	**RK**	Right-side Check RK (right-half frame check) relay in the marker operated from an operated R (right) relay on the selected trunk link frame. This causes the marker to test junctors serving the right half of the trunk link frame.
SA8 52	**LK**	Left Side Check LK (left half frame check) relay in the marker operated from an operated L (left) relay on the selected trunk link frame. This causes the marker to test junctors serving the left half of the trunk link frame.
SA8 53	**JCK**	Junctor Connector Check Operation of a JC- (junctor cut-in) relay in the selected trunk link connector has operated the JCK0 and JCK1 relays in the marker. If CH0 or CH1 operates, JCK0 and JCK1 will release.
SA8 54	**TCHK**	Test Channel Check Marker TCH0-9 (test channel) relay operated to indicate channel numbers in the selected junctor subgroup associated with the trunk link frame.
SA7 00	**TK**	Test Check Necessary functions in the marker have been completed to close a channel. The TK (test check for channels) relay in operating will initiate marker functions for channel test.
SA7 01	**RL**	Release Marker grounded the RL lead to the originating register marker connector.
SA7 02	**HTR**	Heavy Traffic Heavy traffic condition - the marker was idle less than one second from previous seizure or the marker is establishing the call-back stage of a PBX call.
SA7 03	**HMS1**	Hold Magnet Start 1 Marker initiated the operation of selected channel hold magnets.
SA7 04	**LTR-LXPA**	Light Traffic (LTR) Line Hold Magnet (LXPA) Light traffic condition - the marker was idle more than one second from previous seizure. Line Hold Magnet (LXPA) Operation of line hold magnet.
SA7 10	**JXPA**	Junctor Crosspoints Check Auxiliary Junctor sleeve continuity to line link frame checked.
SA7 11	**SL**	Sleeve (trunk link frame) Closure of trunk link frame switch crosspoints.
SA7 12	**CHE-JXP1**	Channel End (CHE)-Junctor Crosspoints Check (JXP1) Channel selection not completed. (CHE) Junctor Crosspoints Check (JXP1) Junctor crosspoints closed.
SA7 13	**LXP1**	Line Crosspoint 1 LXP relay in the marker had not operated to indicate continuity of the line sleeve to battery through the line hold magnet.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA7 14	GLH	Ground Line Hold Magnet Marker started to operate the selected line hold Magnet.
SA7 20	CON	Continuity Completion of line continuity test.
SA7 21	GT2	Ground Test Auxiliary Checks the operation of CON1, CON2, SL, and LLC1 and the nonoperation of LXP1, LXP, and SP relays.
SA7 22	DCT	Double Connection Test Double connection did not exist on the selected channel.
SA7 23	RSC	Release Sender Connector Sender registration was satisfactory and the marker is to release the sender connector.
SA7 24	AVK1	Sender Advance Check Marker has checked that the sender AV relay had locked operated.
SA7 30	DCT1	Double Connection Test 1 Locks in the indication of a successful double connection test on terminating (call-forward) stage of an intraoffice trunk connection. Also successful similar test on a dial tone connection, an outgoing, or an incoming trunk connection.
SA7 31	DCT3	Double Connection Test 3 Successful completion of a double connection test on a tandem or toll trunk connection and the successful check that the tandem or toll completing path to the outgoing trunk is set up.
SA7 32	LK1	Linkage Check 1 Successful completion of linkage between: a. Calling line and originating register on a dial tone connection. b. Called line and incoming trunk on an incoming trunk connection. c. Called line and intraoffice trunk on an intraoffice trunk connection. d. Calling line and outgoing trunk on an outgoing trunk connection.
SA7 33	DCT2	Double Connection Test 2 Successful completion of a double connection test on originating (call-back stage of an intraoffice trunk connection).
SA7 34	DIS1	Disconnect Marker completed all its functions and is ready to request the associated marker connector to make a normal disconnect.
SA7 40	OSE	Outgoing Sender End Operation of marker OSE (outgoing sender end) relay to end outgoing sender selection.
SA7 41	OSK	Outgoing Sender Check Operation of marker OSK (outgoing sender check) relay showing that selection of the sender is completed.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA7 42	**TSR**	Timing Sender Registration All sender connector relays had operated and the marker is to start timing for the operation of the sender memory relays.
SA7 43	**OST2**	Outgoing Sender Timing 2 Sender registration timing is completed and the sender memory relays are being checked for holding before releasing the sender connector.
SA7 44	**RNT2**	Recorder Number Timing a. Timing interval for operation of AMA recorder number relays in the sender is completed and a check is being made of their holding ability. b. Timing interval for operation of pulse conversion class relays in sender is completed.
SA7 50	**RNK**	Recorder Number Check a. Marker has satisfactorily completed the check of the AMA recorder number relay operation in the sender. b. Marker has satisfactorily completed the condition of pulsing check.
SA7 51	**SLK1**	Sender Link Check 1 Lead from the sender link hold magnet is continuous.
SA7 52	**SLK2**	Sender Link Check 2 Sender link hold magnet operated and closed the cross-points.
SA7 53		Unassigned
SA7 54	**CGT**	Cancel Ground Test Marker canceled ground test as is required on certain types of connections, such as all originating and certain types of terminating calls, or if one of the cancel ground test keys is operated at the master test frame.
SA6 00	**XCL**	Cross Class More than one CL- (0/5P or CL 0/5S) lead in the marker is grounded.
SA6 01	**XCR**	Cross Code Route More than one CR-(0/4P, 0/4S) lead in the marker operated.
SA6 02	**XDL**	Cross Deletion More than one DL- (0/6P, 0/6S) lead in the marker operated.
SA6 03	**XMB**	Cross Message Billing More than one message billing index is recorded in the marker.
SA6 04	**XCP**	Cross Code Pattern More than one CP- (0/4P, 0/4S) lead in the marker is grounded.
SA6 10	**XOB**	Cross Service Observation Both the NOB and OBS (observation) relays in the marker operated.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA6 11	**XTV**	Cross Transverter - Service Class Both the TVA (transverter test) and SCC (service class) relays in the marker operated.
SA6 12	**XT5**	Cross Transmission False grounds on unused transmission leads to outgoing sender connector.
SA6 13	**XTB**	Cross Trunk Block More than one TB- (trunk block) relay in the marker operated.
SA6 14	**XTG**	Cross Trunk Group More than one TG- (trunk group) relay in the marker operated.
SA6 20	**XTB1**	Cross Trunk Block Leads Crossed TB- (trunk block) leads to trunk link frame. (Checks for false battery.)
SA6 21	**XTG1**	Cross Trunk Group Leads Crossed TG- (trunk group) leads to trunk link frame. (Checks for false grounds.)
SA6 22	**XJC**	Cross Junctor Connector Leads Crossed JC- (junctor connector) leads to trunk link frame.
SA6 23	**XJG**	Cross Junctor Group Leads Crossed JG- (junctor group) leads to trunk link frame.
SA6 24	**XJS**	Cross Junctor Select Magnets Crossed JS- (junctor switch select magnet) leads to trunk link frame.
SA6 30	**XLR**	Cross Left and Right Sides Crossed L (left) and R (right) leads to their respective relays on the trunk link frame.
SA6 31	**XTS**	Cross Trunk Switch Select Magnets A false cross to battery on ASM, BSM or TSX (select magnet battery) leads to trunk link frame.
SA6 32	**XLC**	Cross Link Connector Crossed LC- (link connector) leads to trunk link frame.
SA6 33	**XLV**	Cross Level Leads Crossed LV- (level) leads to trunk link frame.
SA6 34	**XAB**	Cross A and B Side Simultaneous operation of FAK and FBK relays in marker.
SA6 40	**XF**	Cross Frame Crossed RF (regular frame) and EF (extension frame) leads to trunk link frame.
SA6 41	**XSL**	Cross Sleeve Trunk False ground on AST or BST leads to trunk link frame.
SA6 42	**XTS1**	Cross Trunk Selection False ground on TSX- (trunk select magnet) lead to trunk link frame during trunk selection.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA6 43	**XPT**	Cross Incoming Trunk Class Crossed or falsely grounded incoming trunk class and AMA recorder number leads to trunk link frame.
SA6 44	**XRS**	Cross Ringing Select Magnet Leads Cross RS- (ringing selection magnet) leads to trunk link frame.
SA6 50	**XRS1**	Cross Ringing Select Magnet Selections Both RS0 and RS1 and/or more than one RS2-9 relays in the marker had operated.
SA6 51	**XFT**	Cross FTC Leads An unused FTC lead in the selected trunk link frame is falsely grounded or that the marker had been directed to a trunk link frame which does not include any trunks for the route.
SA6 52	**TRL**	Trouble Release Ground placed on TRL lead to marker connector by the marker after a trouble record or an attempt to seize the trouble recorder on first trial failures. This causes the connector to reseize a marker on a second trial basis.
SA6 53	**BT**	Busy Tone The marker, by grounding BT lead to marker connector, requested: a. Originating register to return busy tone to calling subscriber or to release because of a second trial failure. b. Incoming register to release because of a second trial failure. c. Line link to release because of a second trial failure.
SA6 54	**MRL**	Marker Release Marker signaled the marker connector over MRL lead to release the associated incoming or originating register.
SA5 00	**XHG**	Cross Horizontal Group More than one HG- (horizontal group) relay operated in line link connector.
SA5 01	**XLG**	Cross Line Group More than One LG- (line group connector) relay operated in line link connector.
SA5 02	**XCS**	Cross Class of Service More than one CS- (class of service) relay in the marker had operated due to crossed CS- leads in line link frame.
SA5 03	**XLS**	Cross Line Select Magnets Crossed SM- (select magnet) leads to line link frame.
SA5 04	**XLH**	Cross Line Hold Magnets Crossed LH- (line hold) leads to line link frame on dial tone job under light traffic condition (provisional).
SA5 10	**XLO**	Cross Lockout False ground on LO/LOB/LOK/G leads to LO (lockout for dial tone calls) relay in line link frame.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA5 11	XFTT	Discontinued
SA5 12	XFUT	Cross Frame Units and Tens Test More than one FUT- (frame units test) or FTT- (frame tens test) relay in the marker had operated.
SA5 13	XRCT	Discontinued
SA5 14	XSS	Cross Sender Select Magnets Crossed SS- (sender select magnet) leads to sender link via trunk link frame.
SA5 20	XS	Cross Sender Connector More than one S- (sender) relay in an outgoing sender connector operated.
SA5 21	XSA	Cross Sender Connector Relay a. More than one AMA (automatic message accounting) relay in an outgoing sender connector operated. b. More than one PC (pulse conversion control) relay in an outgoing sender connector operated.
SA5 22	XN	Cross Number Control Mismatch due to more than one called-number control relay (TBIA, RIA, TNRI, NE, OAN, OBN) being operated in the marker.
SA5 23	XFG	Cross Frame Group Simultaneous operation of FG0 and FG1 (trunk frame group) relays in the marker.
SA5 24	XPG	Cross Pattern Group Operation of more than one pattern (PA, PB, PC, PNR) relay in the marker.
SA5 30	XPTN	Cross Pattern Relays Operation of more than one P- (pattern) relay in the marker.
SA5 31	XT	Cross Translation Control Operation of more than one translation control (THC, PHC, OA, OB X11, 11X, TC5, TC6, TC7) relay in the marker.
SA5 32	XCLC	Cross Class Control Operation of more than one class control (OR, TAN, TOL, INC, RO) relay in the marker.
SA5 33	XCKR	Cross or Ground on Class Check Circuit False ground on class check circuit during a dial tone connection. Ground is on the class check circuit during intraoffice and outgoing trunk connections.
SA5 34	XTC	Cross Traffic Control False ground on TC (traffic control) lead to line link marker connector.
SA5 40	XTC1	Cross Traffic Control Auxiliary False ground on TC1 (traffic control) lead to line link marker connector.
SA5 41	XTRK	Cross First Trial Check Lead False ground on TRK (first trial check) lead to marker connectors when marker is functioning on a second trial.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA5 42	XTRL	Cross Trouble Release False ground on TRL (trouble release) lead to marker connectors.
SA5 43	XBT	Cross Busy Tone False ground on BT (busy tone) lead to marker connector.
SA5 44	XRL	Cross Release False ground on RL (release) lead to originating register marker connector.
SA5 50	XMRL	Cross Marker Release False ground on MRL (marker release) lead to marker connector.
SA5 51	XAN	Crossed Allotter Number a. Failure to match between marker and number group indications on allotted PBX numbers. b. Two or more allotted number relays operated.
SA5 52	XCH	Cross Channel Test False ground on any J0-9 and/or LH0-9 lead to trunk link frame and/or LL0-9 lead to line link frame.
SA5 53	XVGA	Cross Vertical Group A Crossed VGA- (vertical group relay for originating call) leads to line link marker connector.
SA5 54	XVGB	Cross Vertical Group B Crossed VGB- (vertical group relay for class of service) leads to line link marker connector.
SA4 00-04,10	FTT0-5	Frame Tens Test a. FTT- (frame tens test) relay operated in the marker to aid in closing through the ST- (start) lead to the line link connector. One FTT- and one FUT- perforation identifies the line link frame. b. Locates the line in trouble in terms of the tens digit of the line link frame on line insulation tests.
SA4 11-14 20-24, 30	FUT0-9	Frame Units Test a. FUT- (frame units test) relay operated in the marker to aid in closing through the ST- (start) lead to the line link connector. One FTT- and one FUT- perforation identifies the line link frame. b. Locates the line in trouble in terms of the units digit of the line link frame on line insulation tests.
SA4 31-34 40-44 50-52	VGT0-11	Vertical Group Test a. The marker VGT- (vertical group identification test) relay operated from the number group to identify the vertical group of the called line. b. The marker VGT- relay operated on the originating (call-back) stage of a reverting, intraoffice, or subscriber outgoing trunk connection from the calling line location registered in the marker. c. The marker VGT- relay operated on a dial tone connection from the line, line link, and connector. d. Identifies the line in trouble in terms of its vertical group location on line insulation tests.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA4 53		Unassigned
SA4 54		Unassigned
SA3 00-04 10-14	HGTO-9	Horizontal Group Test a. The marker HGT- (horizontal group identification test) relay operated from the number group to identify the horizontal group of the called line. b. The marker HGT- relay operated on the originating (call-back) stage of a reverting, intraoffice, or subscriber outgoing trunk connection from the calling line location registered in the marker. c. The marker HGT- relay operated on a dial tone connection from the line, line link and connector. d. Identifies the line in trouble in terms of its horizontal group location on line insulation tests.
SA3 20-24	VFTO-4	Vertical File Test a. The marker VFT- (vertical file identification test) relay operated from the number group to identify the vertical file of the called line. b. The marker VFT- relay operated on the originating (call-back) stage of a reverting, intraoffice, or subscriber outgoing trunk connection from the calling line location registered in the marker. c. The marker VGT- relay operated on a dial tone connection from the line, line link, and connector. d. Identifies the line in trouble in terms of its vertical file location on line insulation tests.
SA3 30-34 40-44 50-54	RCT1-15	Ringing Control RCT- (ringing control) relay operated in the marker from the number group, for proper ringing control.
SA2 00-04 10-14 20-24 30-34 40-44 50-54	CSO-29	Class of Service - Translator a. Class of service of the calling line on a dial tone connection, as signaled by the line link connector to the marker. b. Class of service of a called ground start coin line on the terminating (call-forward) stage of an intraoffice or an incoming trunk connection. c. On a line verification test marker stage, the class of service of the line being verified.
SA1 00-04,10	TBO-5	Trunk Block Which TB- (trunk block) relay in the marker operated to cause the operation of corresponding relay in trunk link frame.
SA1 11-14 20-24 30-34 40-44,50	TGO-19	Trunk Group TG- (trunk group) relay operated in the marker by the R- (route relay).
SA1 51		Unassigned
SA1 52		Unassigned
SA1 53		Unassigned
SA1 54		Unassigned

Card Coordinates		Punch Designation	Functional Meaning and Indication
SAO	00-04 10-14 20-24 30-34 40-44 50-54	FSO-29	Frame Selection a. Trunk link frame selected. b. On line insulation tests, the resistance band in which a failure occurred on an initial test of a line. (FSO-2)
RA8	00-04 10-14 20-24 30-34	TSO-19	Trunk Selected The TSO-19 (trunk or originating register selected) relay operated in the marker.
RA8	40-44 50-52	LV2-9	Level LV- (level) relay operated on the trunk line frame to show the horizontal level of the trunk switch on which the selected trunk appears.
RA8	53		Unassigned
RA8	54		Unassigned
RA7	00-04 10-14	LCO-9	Link Connector The LC- (link cut-in) relay operated on the trunk link frame for link selection. This also indicates the trunk switch on the trunk link frame on which the selected trunk is located. Also indicates the vertical unit on the junctor switch of the trunk link frame.
RA7	20		Unassigned
RA7	21		Unassigned
RA7	22	SF	Single Frame The trunk link frame signals the marker to function for single frame operation.
RA7	23	PR	Paired Frame The trunk link frame signals the marker to function for paired frame operation.
RA7	24	TTF	Tripled Frame The trunk link frame signals the marker to function for tripled frame operation.
RA7	30	RF	Regular Frame Marker functioned to operate the RF relay on the trunk link frame.
RA7	31	EF	Extension Frame Marker functioned to operate the EF relay on the trunk link frame.
RA7	32	SEF	Second Extension Frame Marker functioned to operate the SEF relay on the trunk line frame.
RA7	33		Unassigned
RA7	34		Unassigned
RA7	40		Unassigned
RA7	41	NOC	No Class No trunk class conditions are required for this call.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA7 42	CLG	Class Grounds The marker CLG (class ground) relay is functioning to apply ground to operate the class relays in the outgoing trunk or to transmit party class to outsender.
RA7 43	CLT1	Class Timing 1 The marker is timing for the operation of trunk class relays.
RA7 44	CLT2	Class Timing 2 The marker completed timing for operation of trunk class relays and is now timing for their locking-in feature.
RA7 50	CLK	Class Check The marker satisfactorily checked the locking-in of the trunk class relays.
RA7 51	OTT	Operate Trunk Test Relay The marker functioned to operate the TT (trunk test) relay in the selected trunk for test connection functions.
RA7 52	TTK	Trunk Test Relay Check The TT relay in the selected trunk operated and establishing a locking circuit.
RA7 53	ND1	No Digits The marker prepares to send a "no digit to be pulsed" signal to the sender.
RA7 54	NDK	No Digits Check The marker had sent the "no digit to be pulsed" signal to the sender which was received and locked-in by the sender.
RA6 00-04 10-14	JC0-9	Junctor Cut-in The junctor cut-in (JC-) relay to be operated on the trunk link frame. The JC- relay operation closes the J0-9 leads, on the trunk link frame, to the marker for idle junctor selection. Also closes the operate paths to the junctor switch select magnets on the trunk link frame. The horizontal (operated select magnet) on the trunk link frame junctor switch is always the same as the JC- relay operated.
RA6 20-24	JG0-4	Junctor Group The JG- (junctor group) relay operated in the marker, thus showing the junctor subgroup used for the call.
RA6 30	PNR	Pattern Normal The marker PNR (pattern normal) relay operated signifying the selected junctor subgroup consisted of a full group of ten junctors.
RA6 31	PA	Pattern A The marker PA relay operated to signify the selected junctor subgroup consisted of less than ten junctors.
RA6 32	PB	Pattern B The marker PB relay operated to signify the selected junctor subgroup consisted of less than ten junctors.
RA6 33	PC	Pattern C The marker PC relay operated to signify the selected junctor subgroup consisted of less than ten junctors.

Card Coordinates		Punch Designation	Functional Meaning and Indication
RA6	34	PE	Pattern E The marker PE relay operated to signify the selected junctor subgroup consisted of less than 10 junctors.
RA6	40-44 50-54	PO-9	Pattern Number The P- (pattern) relay operated in the marker to identify the junctor subgroup pattern and to identify the junctors which are available within the junctor subgroup. The PA, PB or PC punch together with a PO-9 determine the available junctors according to the pattern.
RA5	00 01 02 03 04	LLO 1 2 4 7	Line Linkage The line link used on a dial tone connection. This information, which was stored in the register while the call was being set up, is passed back to the marker after dialing, to indicate that this part of the channel is to be considered idle when making channel test for the originating (call-back) stage of an intraoffice trunk connection or a subscriber outgoing trunk connection.
RA5	10-14 20-24	CHO-9	Channel Selected channel. The channel number corresponds to the number of the select magnet operated on the line link frame line switch. The channel number corresponds to the junctor switch number on both the line link and trunk link frame. The channel number corresponds to the vertical unit on the trunk link frame trunk switch.
RA5	30-34 40-44	RSO-9	Ringing Selection Which two RS- (ringing selection) relays operated in the marker to operate the ringing switch select magnets on the ringing control switch associated with selected trunk. Should be either an RSO-1 and one of RS2-9.
RA5	50		Unassigned
RA5	51		Unassigned
RA5	52		Unassigned
RA5	53	STP1	Junctor Step 1 The marker had made a first test of the junctor subgroups, as is normally done.
RA5	54	STP2	Junctor Step 2 The marker recycled to make a second test of the junctor subgroups when a channel retest was necessary due to an all busy condition encountered.
RA4	00-03	NGCTO-3	Number Group Connector Tens Digit Identifies the number group connector tens digit.
RA4	04, 10-14 20-24 30-34 40-44 50-54		Unassigned
RA3	00-04 10-14	NGCU, 0-9	Number Group Connector Units The NGCU- punch indicates the units digit of the number group connector.
RA3	20-24 30-34	HNO-9	Hundreds Digit That the marker had applied battery to the HB- relay in the number group.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA3 40-44 50-54	TO-9	Tens Digit That the marker had applied battery to the TB- (tens block) lead to operate the corresponding TB- relay in the number group.
RA2 00-04 10-14	UO-9	Units Digit That the marker had applied battery to the U- (units) lead to operate the corresponding U- relay in the number group.
RA2 20	OA	Office A The number group MCC relay for office A operated.
RA2 21	OB	Office B The number group MCC relay for office B operated.
RA2 22	AN	Allotted Number Marker worked with an allotted PBX number.
RA2 23	SNG	Seize Number Group The marker is preparing to seize the number group.
RA2 24	NGK	Number Group Check The marker had seized the number group and operated its MCA (marker cut-in) relay.
RA2 30	NGK1	Number Group Check Auxiliary The marker NGK1 (number group check auxiliary) relay operated to supply battery to "F", "L" and "G" leads to number group.
RA2 31	UK	Units Check The U- (units) relay in the number group operated.
RA2 32	HTUK	Hundreds, Tens, Units Check The satisfactory operation of the number group hundreds, tens, and units relays and that the marker has started a timing interval for registration of number group information in the marker.
RA2 33	TNK	Tens Number Check On a toll or tandem trunk connection, that a trunk number is involved.
RA2 34	PTK	Physical-Theoretical Check The connection has satisfactorily completed the physical and theoretical office check.
RA2 40	PBX1	Private Branch Exchange The call is to a PBX subscriber or to other lines having PBX hunting.
RA2 41	SLCK	Sleeve Check The SC (sleeve connector) relay in the number group had operated and locked, in series with the SLCK (sleeve connector check) relay in the marker.
RA2 42	CKO	Check Operation The marker has begun a recycle of called line identification on a PBX, RI, TBI, or BN class.
RA2 43	CKR	Check Released The marker has completed the called line identification recycle described in line above (RA2 42).
RA2 44	A	Advance of Marker The marker functioned to make a number group advance from one tens block relay to the next, in the event that no idle line is found in the first tens block or to prepare the marker to set up busy-back if all PBX lines are busy.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA2 50	AK	Advance Check The number group completed the advance from one tens block to another.
RA2 51	SAE	Sleeve Auxiliary End There is at least one idle PBX line available within a tens block.
RA2 52	EG	End Group The number group signals the marker that the end of a PBX group (tens block) has been reached without finding an idle line and no further TB- relay operation is to be made.
RA2 53	RNG	Release Number Group The called line identification has been successfully recorded and the number group is to be released by the marker.
RA2 54	NR	Number Release Marker RNG (release number group), TBI (trouble intercept), RI (regular intercept), BN (blank number), or PUL (plugged-up line) relay operated to release the number group.
RA1 00	PTN	Physical-Theoretical Number The HB- (hundreds block) relay operated in a number group serving a nondiscriminating office.
RA1 01	PN	Physical Number The HB- (hundreds block) relay operated in a number group serving a physical office.
RA1 02	TN	Theoretical Number The HB- (hundreds block) relay operated in a number group serving a theoretical office.
RA1 03	EN	Extra-theoretical Number The HB- (hundreds block) relay operated in a number group serving an extra-theoretical office.
RA1 04	PBN	Permanently Busy Number The operation of marker PBN (permanently busy number) relay when the called number is a permanently busy line.
RA1 10	FNA	Free Number - Group A The operated FN- (free number) relay in the number group is cross-connected to operate the marker FNA relay when 4-wire ringing selection switches are installed.
RA1 11	FNB	Free Number - Group B The operated FN- (free number) relay in the number group is cross-connected to operate the marker FNB relay when 6-wire or a combination of 4- and 6-wire ringing selection switches are installed.
RA1 12	LIN	Local Incoming The marker has prepared to serve an intercept condition on a connection served by an intraoffice, reverting, or local incoming trunk.
RA1 13	TIN	Toll Incoming The marker has prepared to serve an intercept condition on a connection served by a toll incoming trunk.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA1 14	BN	Blank Number The marker recognized that this connection was to a blank (unassigned or unequipped) number and functioned to route this connection to a tone trunk or intercept operator.
RA1 20	RI	Regular Intercept The marker functions to route this connection to regular intercept trunk.
RA1 21	TBI	Trouble Intercept The marker functions to route this connection to a trouble intercept trunk.
RA1 22	TBH	Trouble Intercept Hold Magnet The marker functioned to operate its TBH (trouble intercept, hold magnet, operate ringing switch) relay to reset the trunk ringing switch for ringing into a trouble intercept trunk.
RA1 23	OV	Overflow The marker is to set the incoming trunk for overflow (reorder) signal.
RA1 24	BY	Busy Called line is busy; thus the marker is to set the incoming trunk for busy signal.
RA1 30	OFH	Overflow Hold Magnet The marker functioned to operate its OFH (overflow, hold magnet, operate ringing switch) relay to reset the trunk ringing switch for busy or overflow conditions.
RA1 31	PUL	Plugged-up Line The called line was plugged up for reroute to intercept or special operator.
RA1 32	LCH	Local Charge The marker functioned its LCH (local charge) relay for setting up local charge supervision in an incoming, intraoffice, or reverting trunk.
RA1 33	TCH	Toll Charge The marker functioned its TCH (toll charge) relay for setting toll charge supervision in an incoming trunk.
RA1 34	RSK	Ringing Switch Select Magnet Check A ringing switch select magnet had operated.
RA1 40	LI	Line Idle Indicates to the marker that the called line is idle and there is an idle channel available for connection to this idle line.
RA1 41	TCK1	Talking Charge Check The operation of the marker TCK (talking charge check) relay indicates continuity of the TC lead from marker to associated trunk.
RA1 42	SRK	Start Ringing Check The marker had checked the operation of the ringing switch select magnet and also found clear and continuous the RC lead to RC (ringing control) relay in the associated trunk. The operation of the RC relay in the trunk caused the operation of the ringing switch hold magnet associated with this trunk.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA1 43	RCK2	Ringing Switch Crosspoint Check The operation of the marker RCK1 relay indicates crosspoint closure of the ringing selection switch. This also checks the holding ground for the trunk RC relay.
RA1 44	RCK3	Ringing and Charging Function The marker functions to operate its RCK3 relay to show a satisfactory check of the charge and ringing conditions.
RA1 50		Unassigned
RA1 51	EX	Extra Presence of battery or ground at particular circuit points. Temporary wiring connected to terminals EXB and EXG on terminal strips, to assist in the analysis of any particular trouble.
RA1 52,53,54	PERF 0,1,2	Perforator Indicates cards associated with a particular trouble recorder in a building having more than one trouble recorder.
RA0 00	DT0	Day Tens The day in tens, as received from the master timer or the time-of-day circuit.
01	1	
02	2	
03	4	
04	7	
RA0 10	DU0	Day Units The day in units, as received from the master timer or the time-of-day circuit.
11	1	
12	2	
13	4	
14	7	
RA0 20	HT0	Hour Tens The hour in tens, as received from the master timer or the time-of-day circuit.
21	1	
22	2	
23	4	
24	7	
RA0 30	HU0	Hour Units The hour in units, as received from the master timer timer or the time-of-day circuit.
31	1	
32	2	
33	4	
34	7	
RA0 40	MT0	Minutes Tens The minutes in tens, as received from the master timer or the time-of-day circuit.
41	1	
42	2	
43	4	
44	7	
RA0 50	MU0	Minutes Units The minutes in units, as received from the master timer or the time-of-day circuit.
51	1	
52	2	
53	4	
54	7	

DOUBLE SIDED TROUBLE RECORDER CARD (REAR)

("R"AND"S"RELAYS)

Card Coordinates		Punch Designation	Functional Meaning and Indication
R0	00-04		Unassigned
	10-14		
	20-24		
	30-34		
	40-44		
	50-54		
R1	00	FT0	Frame Tens The FT- (frame tens) of the line link frame associated with the calling line as registered in the transverter. (AMA)
	01	1	
	02	2	
	03	3	
R1	04	FU0	Frame Units The FU- (frame units) of the line link frame associated with the calling line as registered in the transverter. (AMA)
	10	1	
	11	2	
	12	4	
	13	7	
R1	14	VG0	Vertical Group The VG- (vertical group) of the calling line as registered in the transverter. (AMA)
	20	1	
	21	2	
	22	4	
	23	7	
	24	10	
R1	30	SW0	Switch The SW- (switch or horizontral group) of the calling line as registered in the translator and outgoing sender on an AMA call.
	31	1	
	32	2	
	33	4	
	34	7	
R1	40	VF0	Vertical File The VF- (vertical file) of the calling line as registered in the translator, and outgoing sender on an AMA call.
	41	1	
	42	2	
	43	3	
	44	4	
R1	50-54		Unassigned
R2	00	CP0	Code Pattern The called party area as transmitted from sender to transverter for AMA functions. The above information notifies the transverter as to the number of digits in the called office code (0 to 3) and the area, extended or local.
	01	1	
	02	2	
	03	4	
	04	7	
R2	10	MB0	Message Billing Index The message billing index as transmitted from sender to transverter for AMA functions.
	11	1	
	12	2	
	13	4	
	14	7	
R2	20	RN0	Recorder Number The number of the AMA recorder associated with a selected trunk, as transmitted from sender to transverter. (AMA, or CAMA)
	21	1	
	22	2	
	23	4	
	24	7	

Card Coordinates	Punch Designation	Functional Meaning and Indication
R2 30 31 32	OARO 1 2	Originating Area Identification of the area in which the CAMA call has originated.
R2 33,34 40-44		Unassigned
R2 50 51 52 53	TARO 1 2 3	Terminating Area Identification of terminating area in which called number is located. (CAMA)
R2 54		Unassigned
R3 00-04 10-14		Unassigned
R3 20	OD RNTO	Operator Identified Call (OD) - Recorder Number Tens (RNTO) The CAMA equipment has identified the calling number through the CAMA operator. (OD). Tens number of the recorder as registered in the transverter. (RNTO) (AMA)
R3 21	AD RNT1	Automatically Identified Call (AD) - Recorder Number Tens (RNT1) The CAMA equipment has identified the calling number automatically. (AD) Tens number of the recorder as registered in the transverter. (RNT1) (AMA)
R3 22,23		Unassigned
R3 24	LST	Lettered Stations Operation of the LST (four digits plus lettered stations) relay in the outgoing sender for AMA functions.
R3 30	L5D	Lettered Stations or Five Digits Operation of the L5D (lettered stations or five digits) relay in the outgoing sender for AMA functions.
R3 31	4DG	Four Digits Maximum Operation of the 4DG (four digits maximum) relay in the outgoing sender for AMA functions.
R3 32	5DG	Five Digits Only Operation of the 5DG (five digits, no letters) relay in the outgoing sender for AMA functions.
R3 33	SC	Service Call Operation of the SC (service call) relay in the outgoing sender for AMA or CAMA functions.
R3 34	TVT	Transverter Test Operation of the TVT (transverter test) relay in the outgoing sender for AMA or CAMA functions.
R3 40,41		Unassigned
R3 42 43 44	LCDO 1 2	Local Code Dialed The CAMA transverter has grounded LCD- lead to the CAMA transverter connector.
R3 50	ACD	Area Code Dialed The CAMA transverter has gounded ACD lead to the CAMA transverter connector.

Card Coordinates	Punch Designation	Functional Meaning and Indication
R3 51	VTC	Vacant Terminating Code The CAMA transverter has functioned to ground VTC lead to CAMA transverter connector.
R3 52	DNC	Denied Code The CAMA transverter has functioned to ground DNC lead to the CAMA transverter connector.
R3 53	FC	Free Call The CAMA transverter functioned to ground FC lead to the CAMA transverter connector.
R3 54	WKC	Working Code The CAMA transverter functioned to ground WKC lead to the CAMA transverter connector.
R4 00-04 10-14 20-24 30-34 40-44		Unassigned
R4 50 51	SKO 1	Sender Check The sender has signaled the CAMA transverter that it has properly registered various bits of information received from the transverter.
R4 52,53		Unassigned
R4 54	TC	Test Code The billing indexer has informed the CAMA transverter that a 10X test call has been made.
R5 00 01 02 03 04	FRO 1 2 3 4	Transverter Connector Frame The number of the transverter connector frame (AMA or CAMA). (1-4) The number of the transverter connector frame (AMA).
R5 10,11,12	CNO,1,2	Connector Number Particular connector number in the transverter connector frame (AMA, CAMA).
R5 13	CN3	Connector Number Particular connector number in the transverter connector frame (CAMA).
R5 14,20-24 30-33 34-43	SO-14	Sender Position of particular sender in the transverter connector (AMA,CAMA).
R5 44		Unassigned
R5 50 51 52	ORCO 1 2	Originating Rate Class The originating rate class as transmitted from the CAMA sender to the CAMA transverter.
R5 53, 54		Unassigned

Card Coordinates	Punch Designation	Functional Meaning and Indication
R6 00	0G0	**Originating G Code Digits** The originating "G" code digits transmitted to CAMA transverter by sender via the CAMA transverter connector.
01	1	
02	2	
03	3	
04	4	
R6 10-14		**Unassigned**
20-24		
30-34		
40-44		
50-54		
R7 00	0A0	**Originating A Code Digits** Same as for "G" Code above. (R600-04)
01	1	
02	2	
03	4	
04	7	
R7 10	0B0	**Originating B Code Digits** Same as for "G" code above. (R600-04)
11	1	
12	2	
13	4	
14	7	
R7 20	0C0	**Originating C Code Digits** Same as "G" above. (R600-04)
21	1	
22	2	
23	4	
24	7	
R7 30	0D0	**Originating D Code Digits** Same as "G" above. (R600-04)
31	1	
32	2	
33	4	
34	7	
R7 40	0E0	**Originating E Code Digits** Same as "G" above. (R600-04)
41	1	
42	2	
43	4	
44	7	
R7 50	0F0	**Originating F Code Digits** Same as "G" above. (R600-04)
51	1	
52	2	
53	4	
54	7	
R8 00	G0	**G Digit** The G code digit transmitted to transverter by outsender via transverter connector (AMA, CAMA).
01	1	
02	2	
03	4	
04	7	
R8 10	H0	**H Digit** The H code digit transmitted to transverter by outsender via transverter connector (AMA, CAMA).
11	1	
12	2	
13	4	
14	7	
R8 20	J0	**J Digit** The J code digit transmitted to transverter by outsender via transverter connector (AMA, CAMA).
21	1	
22	2	
23	4	
24	7	

Card Coordinates	Punch Designation	Functional Meaning and Indication
R8 30 31 32 33 34	K0 1 2 4 7	K Digit The K code digit transmitted to transverter by outsender via transverter connector (AMA, CAMA).
R8 40 41 42 43 44	L0 1 2 4 7	L Digit The L code digit transmitted to transverter by outsender via transverter connector (AMA).
R8 50	M7	Maximum Digits The last digit of a maximum of eleven digits was registered (AMA).
R8 51-54		Unassigned
S0 00-02	A'0 1 2	A' Digit a. The A lead grounded between the transverter and an AMA recorder which may or may not be attached. b. Lead grounded by master timer, if attached to recorder A'0, A'1 (AMA or CAMA transverter trouble records with or without recorder attached. A'1 (AMA or CAMA trouble records with recorder attached).
S0, 03, 04		Unassigned
S0 10 11 12 13 14	B'0 1 2 4 7	B' Digit a. The B lead grounded between the transverter and an AMA recorder which may or may not be attached (AMA, CAMA). b. Lead grounded by master timer, if attached to recorder (AMA, CAMA).
S0 20 21 22 23 24	C'0 1 2 4 7	C' Digit Same as for B' digit. (S0 10-14)
S0 30 31 32 33 34	D'0 1 2 4 7	D' Digit Same as for B' digit. (S0, 10-14)
S0 40 41 42 43 44	E'0 1 2 4 7	E' Digit Same as for B' digit. (S0, 10-14)
S0 50 51 52 53 54	F'0 1 2 4 7	F' Digit Same as for B' digit. (S0, 10-14)
S1 00-04	A0 1 2 4 7	A Digit The A Code digit transmitted to transverter by outsender via transverter connector (AMA, CAMA).
S1 10-14	B0 1 2 4 7	B Digit Same as for A digit. (S1, 00-04)

Card Coordinates	Punch Designation	Functional Meaning and Indication
S1 20-24	CO 1 2 4 7	C Digit Same as for A digit. (S1,00-04)
S1 30-34	DO 1 2 4 7	D Digit Same as for A digit. (S1,00-04)
S1 40-44	EO 1 2 4 7	E Digit Same as for A digit. (S1,00-04)
S1 50-54	FO 1 2 4 7	F Digit Same as for A digit. (S1,00-04)
S2 00-04 10-14,20		Unassigned
S2 21	OBS	Observed Outgoing sender signals the transverter that this call is up on service observation (AMA, CAMA).
S2 22	NOB	Nonobserved Outgoing sender signals the transverter that this call is not up on service observation (AMA, CAMA).
S2 23,24		Unassigned
S2 30,31	ORTO,1	Originating Rate Treatment - Tens The originating rate treatment tens digit, derived from the 1st translation of the billing indexer circuit (CAMA).
S2 32,33,34		Unassigned
S2 40-44	ORUO 1 2 4 7	Originating Rate Treatment - Units The originating rate treatment units digit derived from the 1st translation of the billing indexer circuit (CAMA).
S2 50-54	OINO 1 2 4 7	Office Index Number The office index number that identifies the originating office of the ten offices which may be assigned to a recorder on the AMA tape (CAMA).
S3 00-04 10-14 20-24		Unassigned
S3 30 31 32 33 34	RGO 1 2 4 7	Recorder Group Number The recorder group number with which the selected AMA recorder is associated (CAMA).

Card Coordinates	Punch Designation	Functional Meaning and Indication
S3 40 41 42	ATO 1 2	Area Transfer Identification of originating area. At present this should match the originating area indication. At some later date when it may be possible to have offices out of place in the recorders, this feature will be used to correctly identify the originating area. In these cases AT- will not always match OAR-. Derived from 1st translation of billing indexer circuit (CAMA).
S3 43,44		Unassigned
S3 50 51 52	ECO 1 2	Entry Combination These are patterns used in conjunction with the message billing index to determine the type of entry to be made. Derived from the 1st translation of the billing indexer circuit (CAMA).
S3 53-54		Unassigned
S4 00-04 10-14	RST0-9	Recorder Start a. The AMA recorder start lead closed to the master timer when the master timer requested the trouble recorder.
S4 20-24 30-34	RST10-19	b. The AMA recorder start lead closed to the transverter when the transverter requested the trouble recorder. c. The regular AMA recorder which has been transferred to the emergency recorder prior to the time the regular AMA recorder called for the trouble recorder. If no AMA recorder transfer takes effect during this call, an operated RST- position will be matched by a correspondingly numbered perforation in the DR- group. (In offices having more than ten recorders the RST perforation will also be accompanied by a DRTO or 1 perforation to indicate the tens group of the recorder when an AMA recorder calls for trouble record or by a DRATO or 1 perforation when a transverter calls for the trouble record and has recorder attached). If there is a transfer of an AMA recorder to the emergency recorder while handling this call, the RST- perforation will indicate the AMA recorder transferred and the DR-EMG will be perforated to indicate that the emergency recorder is associated and involved in the trouble record.
S4 40-44	TRTO 1 2 4 7	Terminating Rate Treatment (Tens Digit) Derived from the 2nd translation of the billing indexer circuit (CAMA).
S4 50-54	TRUO 1 2 4 7	Terminating Rate Treatment (Units Digit) Derived from the 2nd translation of the billing indexer circuit (CAMA).
S5 00	RST-EMG	Recorder Start Emergency The emergency recorder was associated with the master timer when the master timer called for a trouble record (AMA, CAMA).
S5 01-04 10-14 20-24		Unassigned

Card Coordinates		Punch Designation	Functional Meaning and Indication
S5	30-34	MBIO 1 2 4 7	Message Billing Index Number The message billing indec number which is derived from the 3rd translation in the billing indexer circuit (CAMA).
S5	40 41 42 43 44	TO 1 2 4 7	Trunk Tens The T- (tens) lead grounded by call identity indexer via the AMA recorder for identifying the trunk attached to the AMA recorder (AMA, CAMA).
S5	50 51 52 53 54	UO 1 2 4 7	Trunk Units The U- (units) lead grounded by call identity indexer via AMA recorder for identifying the trunk attached to the AMA recorder (AMA, CAMA)
S6	00-02		Unassigned
S6	03 04 10 11	TIAO-3	Trouble Indicating (CAMA) Sender informs the transverter that: No trouble; used by transverter as a check. Sender trouble. Automatic identification failure. CAMA suspension call.
S6	12-14 20-22		Unassigned
S6	23	LOO	Line Observed A line observed signal was sent from part 0 of the line observing number matching circuit to the transverter circuit (CAMA).
S6	24	NLOO	No Line Observed A no line observed signal was sent from part 0 of the line observing number matching circuit to the transverter circuit (CAMA).
S6	30	REO	Registration Error A registration error signal was sent from part 0 of the line observing number matching circuit to the transverter circuit (CAMA).
S6	31	NMBO	Number Matching Circuit Busy Part 0 of the matching circuit is made busy (CAMA).
S6	32	BBFC	Bulk Billing Free Call The billing indexer has determined that this call has been made to an area requiring bulk billing and/or diversion of free calls(CAMA).
S6	33	TS	Toll Statement Area The billing indexer has determined that this call has been made to an area requiring toll statement treatment (CAMA).
S6	34 40	BIO 1	Billing Indexer The billing indexer 0 or 1 selected by the transverter (CAMA).
S6	41-44 50-54		Unassigned

Card Coordinates	Punch Designation	Functional Meaning and Indication
S7 00	1TR	First Trial of Transverter The transverter connector functioned to operate the transverter 1TR (first trial) relay for a first trial indication (AMA, CAMA).
S7 01	2TR	Second Trial of Transverter The transverter connector functioned to operate the transverter 2TR (second trial) relay for a second trial indication (AMA, CAMA).
S7 02	TM1-TM2T	Time-out 1 (TM1) - TM2 Timing (TM2T) A time-out function of transverter TM1 tube timer which covers the following intervals: a. From seizure of transverter to seizure of translator. (AMA) b. From seizure of AMA recorder until perforating functions are complete. (AMA) TM2 Timing (TM2T) A TM2 time-out has occurred in the transverter which covers the following intervals: a. Seizure of transverter to billing indexer connected (CAMA). b. Billing indexer release to transverter release if no initial entry is required and billing indexer release to recorder connected if an initial entry is required (CAMA). c. Operation of a release relay to transverter release (CAMA).
S7 03	TM2-TM3T	Time-out 2 (TM2) - TM3 Timing (TM3T) A time-out function of transverter TM2 tube timer which covers the following intervals: a. From seizure of translator to seizure of AMA recorder. (AMA) b. From operation of RL (release) relay to restoration of the transverter to normal (AMA). TM3 Timing (TM3T) A TM3 time-out has occurred in the transverters. This time covers the following intervals: a. Billing indexer connected, to Billing Indexer released (CAMA). b. Recorder connected, to operation of a release relay (CAMA).
S7 04	NMF	Number Match Failure A failure was detected in the information received from parts 0 and 1 of the matching circuit (CAMA).
S7 10	TRS	Transfer Start Transverter start lead in a transverter connector was transferred. This record will not indicate a service call failure, but with the information given elsewhere in the trouble record, will indicate a connector trouble in the normal access paths (AMA, CAMA).
S7 11	TR	Trouble Release Trouble release signal sent from transverter to transverter connector. Second trial initiated by transverter connector (AMA, CAMA).
S7 12	TR1T	Trouble Release Trouble release signal sent from transverter to sender. No second trial initiated by transverter connector (CAMA).

Card Coordinates	Punch Designation	Functional Meaning and Indication
S7 13	RL	RL Relay Operation The transverter RL (release) relay operated (AMA, CAMA).
S7 14	RL1	Release 1 Transverter has grounded regular release lead after taking a trouble record (CAMA).
S7 20-22		Unassigned
S7 23	LO1	Line Observed A line observed signal was sent from part 1 of the line observing number matching circuit to the transverter ckt (CAMA).
S7 24	NLO1	No Line Observed A no line observed signal was sent from part 1 of the line observing number matching circuit to the transverter circuit (CAMA).
S7 30	RE1	Registration Error A registration error signal was sent from part 1 of the line observing number matching circuit to the transverter circuit (CAMA).
S7 31	NMB1	Number Matching Circuit Busy Part 1 of the matching circuit is made busy (CAMA).
S7 32	DRTO-DRATO	Display Registered Tens (DRTO,1) - Display Registered (Auxiliary) Tens (DRATO,1) a. The tens number of the recorder on an AMA recorder trouble record (DRTO,1) (AMA) b. The tens number of the AMA recorder (DRATO,1) attached to the transverter when a transverter failure was detected. The transverter number is recorded in the DRO-9 punches. c. CAMA transverter trouble records use only DRTO, DRATO.
S7 33	DRT1-DRAT1	
S7 34,40-53	DRAO-9	Display Registered Auxiliary a. The AMA recorder associated with the transverter when a transverter failure was recorded. The tens number of the recorder is indicated by DRATO or 1. The transverter number is indicated by DRO-9 punches. b. See (C) above for tens number on CAMA transverter T.R.
S7 54	DRA-EMG	Display Registered Auxiliary - Emergency Emergency AMA recorder was attached to the transverter. (AMA, CAMA)
S8 00	TI	Trouble Indication Trouble encountered on a service or test call.
S8 01		Unassigned
S8 02	MTPT	Transverter Line Test Trouble record perforated on a transverter test call. (AMA, CAMA)
S8 03	ATKT	Automatic Trunk Test
S8 04		Unassigned
S8 10	TKT	Trunk Test Trouble record perforated on a trunk test call.
S8 11		Unassigned

Card Coordinates	Punch Designation	Functional Meaning and Indication
S8 12	TLV	Transverter Line Verification Line verification test in the transverter stage. Translator cross connections are checked. (AMA, CAMA)
S8 13	LVF	Line Verification Failure Line verification test failure. (Unsatisfactory test). (AMA, CAMA)
S8 14	LVM	Line Verification Match Line verification test match (satisfactory test). (AMA, CAMA)
S8 20 21 22 23 24 30	TURN-OVER	Turnover A perforation in one of these locations indicates that the trouble condition is to be read on the front of the card.
S8 31	TV	Transverter A transverter engaged the trouble recorder. (AMA, CAMA)
S8 32	REC	Recorder An AMA recorder engaged the trouble recorder.
S8 33	TMG	Timing The master timing circuits engaged the trouble recorder.
S8 34, 40-44 50-53	DRO-9	Display Registered The number of the transverter (DRO-9) (AMA, CAMA). Number of the AMA recorder (DRO-9) or master timing circuit (DRO,1) connected to the trouble recorder.
S8 54	DR-EMG	Display Registered - Emergency The Emergency AMA recorder was connected to the trouble recorder.

"RA" AND "SA" RELAYS (REAR OF CARD)

Card Coordinates	Punch Designation	Functional Meaning and Indication
RAO 00 01 02 03 04	DTO 1 2 4 7	Day Tens The day in tens, as received from the master timer or the time-of-day circuit.
RAO 10 11 12 13 14	DUO 1 2 4 7	Day Units The day in units, as received from the master timer or the time-of-day circuit.
RAO 20 21 22 23 24	HTO 1 2 4 7	Hour Tens The hour in tens, as received from the master timer or the time-of-day circuit.
RAO 30 31 32 33 34	HUO 1 2 4 7	Hour Units The hour in units, as received from the master timer or the time-of-day circuit.
RAO 40 41 42 43 44	MTO 1 2 4 7	Minutes Tens The minutes in tens, as received from the master timer or the time-of-day circuit.

Card Coordinates	Punch Designation	Functional Meaning and Indication
RA0 50 51 52 53 54	MU0 1 2 4 7	Minutes Units The minutes in units, as received from the master timer or the time-of-day circuit.
RA1 00-04 10-14 20-24 30-34. 40-44,50		Unassigned
RA1 51	EX	Extra Presence of battery or ground at particular circuit points. Temporary wiring connected to terminals EXB and EXG on terminal strips, to assist in the analysis of any particular trouble. (AMA, CAMA)
RA1 52 53 54	PERFORATOR 0 1 2	Perforator The trouble recorder which originated the trouble card (in building having more than one trouble recorder).
RA2 00-04 10-14	U0-9	Units Digit The U- (units) relay operated in the transverter by the translator on an AMA call.
RA2 20-24 30-34 40-44 50-54		Unassigned
RA3 00-04 10-14	TH0-9	Thousands Digit The TH- (thousands) relay operated in the transverter by the translator on an AMA call.
RA3 20-24 30-34	HN0-9	Hundreds Digit The HN- (hundreds) relay operated in the transverter by the translator on an AMA call.
RA3 40-44, 50-54	T0-9	Tens Digit The T- (Tens) relay operated in the transverter by the translator on an AMA call.
RA4, RA5, RA6, RA7, 00-04 10-14 20-24 30-34 40-44 50-54		Unassigned
RA8 00-04,10	OFF0-5	Office Group On AMA calls, the OFF0-5 (office number) relay operated in the transverter by the attached translator to indicate the originating office group of a line location.
RA8 11-14 20-24 30-34 40-44 50-54		Unassigned
SA0 00-04 10-14 20-24 30-34	G0-19	Group On AMA calls, the G- (vertical group of 50 lines for line identification) relay operated in the selected translator.
SA0 40,41	GA,GB	Group A,B Group A or B for 2000 line translator. (AMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA0 42-44 50-54		Unassigned
SA1 00-04 10-14 20-24 30-34 40-44 50-54		Unassigned.
SA2 00-04 10-14 20-24 30-34 40-44 50-54	TLR0-29	Translator Number of the translator associated with a transverter on an AMA call.
SA3 00	AC	Area Code The transverter has determined from the B digit of the called number that an area code was registered in the transverter. (CAMA)
SA3 01	7DG	Seven Digit The transverter has determined that a 7 digit call was initiated. (CAMA)
SA3 02	RGK	Recorder Group Check RG relays have been checked operated correctly on a 2/5 basis. (CAMA)
SA3 03	G	Ground Relay G in the transverter has operated. This indicates that the area code is shown as a single digit compressed code on the AMA tape. (CAMA)
SA3 04	T5L	Toll 5 Line Entry The transverter has determined from the area code that a 5 line entry is required on the AMA tape. (CAMA)
SA3 10	T4L	Toll 4 Line Entry The transverter has determined from the area code that a 4 line entry is required on the AMA tape. (CAMA)
SA3 11	OIK	Office Index Check The office index digits sent from the Billing Indexer to the transverter were correctly registered and checked in the transverter. (CAMA)
SA3 12	NMK	Number Match Check The information received from both parts of the Line Observing Number Matching circuit was checked as correct by the transverter. (CAMA)
SA3 13	PRLK	Position Release Check The sender signals that it has received a position release signal. (CAMA)
SA3 14	P2L	Perforate 2 Line Entry The transverter has directed the recorder to perforate a 2 line entry on the AMA tape. (CAMA)
SA3 20	P4L	Perforate 4 Line Entry The transverter has directed the recorder to perforate a 4 line entry on the AMA tape. (CAMA)
SA3 21	P5L	Perforate 5 Line Entry The transverter has directed the recorder to perforate a 5 line entry on the AMA tape. (CAMA)
SA3 22	BIRA	Billing Indexer Release The transverter has released the Billing Indexer Circuit. (CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA3 23	IE	Initial Entry The transverter has operated IE relay and is ready to seize the recorder circuit and make an initial entry on the AMA tape. (CAMA)
SA3 24	ROP	Recall Operator's Position The Billing Indexer circuit has directed the transverter to recall the operator's position. (CAMA)
SA3 30	PRL	Position Release The Billing Indexer circuit has directed the transverter to release the operator's position. (CAMA)
SA3 31	2L	2 Line A 2 line entry is desired for the AMA tape. (CAMA)
SA3 32	4L	4 Line A 4 line entry is desired for the AMA tape. (CAMA)
SA3 33	CK	Check Billing indexer originating and terminating code check. (CAMA)
SA3 34	ABX	ABX Code Relay ABX has operated in the Billing Indexer Circuit. This indicates that the digits received are in the series used for central office designations. (CAMA)
SA3 40	VTC	Vacant Terminating Code The Billing Indexer has determined that this call has been made to a vacant terminating code. (CAMA)
SA3 41	TC	Test Code The Billing Indexer has determined that this call has been made to a test line. (CAMA)
SA3 42	ROP1	Recall CAMA Operator Relay ROP1 has operated in the Billing Indexer circuit. (CAMA)
SA3 43	RSG1	Ring Surge 1 Relay RSG1 has operated in the Billing Indexer circuit indicating that the ring surge for the first translation has been initiated. (CAMA)
SA3 44,50	RSG2,RSG3	Ring Surge 2,3 Same as RSG1 but used for 2nd and 3rd translations. (CAMA)
SA3 51	OTK	Originating Translation Check The first translation in the Billing Indexer has been completed. (CAMA)
SA3 52	TTK	Terminating Translation Check The second translation in the Billing Indexer circuit has been completed. (CAMA)
SA3 53	MBK	Message Billing Index Check The third translation in the Billing Indexer circuit has been completed. (CAMA)
SA3 54		Unassigned
SA4 00-04 10-14	CC0-9	Compressed Code The area code received by the transverter is a compressed code. (CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA4 20-23		Unassigned
SA4 24	TPT	Tip Party Translator The transverter is signalled that this is a tip party call and to use a tip party translator. (AMA)
SA4 30	RPT	Ring Party Translator The transverter is signaled that this is a ring party call and to use a ring party translator. (AMA)
SA4 31		Unassigned
SA4 32	TV	Transverter Connected to AMA Recorder a. The TC (transverter connector) relay operated in the recorder connector showing connection to a transverter. (AMA, CAMA) b. On recorder test connections, the master timer grounded TV lead to simulate a transverter by operating the AMA recorder TVM relay. (AMA, CAMA)
SA4 33	IPA	Identifier Preference The call identity indexer preference relay operated in the AMA recorder.
SA4 34	OTO	OTO Relay Operated The operation of the OTO relay in the AMA recorder.
SA4 40	HR1	Hour Entry Preference The operation of HP (hour preference) relay in the AMA recorder.
SA4 41		Unassigned
SA4 42	A-	Master Timing Circuit Block A The master timer blocked when a plug was inserted into the transfer jack of an AMA recorder.
SA4 43	B	Master Timing Circuit Block B The master timer blocked when a plug was removed from the transfer jack of an AMA recorder.
SA4 44	D	Master Timing Circuit Block D The master timer blocked when a plug was inserted into the make-busy jack of an AMA recorder.
SA4 50	E	Master Timing Circuit Block E The master timer blocked when a plug was removed from the make-busy jack of an AMA recorder.
SA4 51	SP	Splice The master timer blocked during a splice operation.
SA4 52	RT	Recorder Master Timing The AMA recorder was attached to the master timer for an end-of-tape function.
SA4 53	TEN	Test Entry The master timer is being used for test purposes.
SA4 54	ET	End of Tape The master timer was engaged in the end-of-tape operation for tape cutting pattern (3:00 A.M.)
SA5 00	TM	Transverter Timing The transverter connector, upon seizing a transverter, had grounded the TM lead to the transverter to supplement the ground supplied by the transverter for actuating the transverter alarm. (AMA, CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA5 01	CKG-GC	Check Ground (CKG) - Ground Control (GC) a. The transverter connector closed the CKG lead to the transverter to provide off-normal ground and remove standing cross tests. (AMA) b. Relay GC has operated. This relay supplies various grounds in the transverter for the purpose of preventing races in the transverter when it is released. (CAMA)
SA5 02	CK7	Check 7 The transverter functioned to operate its CK7 (check) relay. (AMA)
SA5 03,04	CK1,2	Check 1 and 2 The operation of CK1 and CK2 relays in the transverter checks that the proper number of relays operated to register the information received from the sender. (AMA, CAMA)
SA5 10	CK4	Check 4 The operating paths for the transverter RST- (recorder start) relays have been opened and only one RST-relay is operated and held on its locking path, thereby insuring that only the selected AMA recorder will be served. (AMA)
SA5 11	FABC	Foreign Area Digit Check The transverter register relays operated in proper combination in registering the X0X and X1X codes. (AMA)
SA5 12	FACK	Foreign Area Code Check Cut-in relays released and code translation (X0X and X1X) was completed. (AMA)
SA5 13	DNK	Directory Number Check The proper quota of directory number relays operated from the translator functions. (AMA)
SA5 14	RK	Recorder Check The AMA recorder is attached to the transverter. (AMA, CAMA)
SA5 20	IC	Identifier Check The continuity of the ICK lead thru the AMA recorder, call identity indexer and trunk is satisfactory. (AMA, CAMA)
SA5 21	TOK	Trunk Okay The transverter TOK (trunk okay) relay operated showing the ICK lead checks clear of false battery and ground. (AMA, CAMA)
SA5 22	CI4	Cut-in Fourth Line Perforation The transverter CI4 (cut-in perforator) lead has been grounded, showing process of, or completion of, perforations for the first line of a 4-line entry. (AMA, CAMA)
SA5 23	C13	Cut-in Third Line Perforation The transverter C13 (cut-in perforator) lead has been grounded, showing process of, or completion of, perforations for the second line of a 4-line entry. (AMA, CAMA)
SA5 24	CIFA	Cut-in Five Line Entry All codes were recorded on tape as dialed when foreign area codes, X0X and X1X were used. (AMA, CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA5 30	CI2	Cut-in Second Line Perforation The transverter CI2 (cut-in perforator) lead has been grounded showing process of, or completion of, perforations for the third line of a 4-line entry or the first line of a 2-line entry. (AMA, CAMA)
SA5 31	IRY	Identifier Ready The operation of transverter IR (identifier ready) relay indicates that the trunk number has been checked by the AMA recorder. The transverter should now proceed to send its last line of information to the AMA recorder. (AMA, CAMA)
SA5 32	CI1	Cut-in First Line Perforation The transverter CI1 (cut-in perforator) lead has been grounded showing process of, or completion of, perforations for the last line of an entry. (AMA, CAMA)
SA5 33	P5	Progress Fifth Line The transverter P5 (progress fifth line) relay had operated, indicating that the 1st line of entry had been sent from transverter to AMA recorder. (AMA, CAMA)
SA5 34	RLR	Release Transverter The transverter grounded the RL lead to the transverter connector as a signal to release. (AMA)
SA5 40-44		Unassigned
SA5 50	OF	Overflow The AMA translator cross connection for the calling line transmits an overflow signal to the sender.
SA5 51	TBY	Translator Busy The requested AMA translator is plugged busy.
SA5 52	EXT	Extend Timing The AMA recorder signaled for extended timing in the transverter if the AMA recorder was engaged in an end-of-tape or splice pattern function. (AMA, CAMA)
SA5 53	RB	Recorder Busy The requested AMA recorder is plugged busy. (AMA, CAMA)
SA5 54	BY	Service Busy of Recorder The requested AMA recorder is busy on a service or test call. (AMA, CAMA)
SA6 00	TEA	Trouble Entry-transverter The operation of the transverter TEA (trouble entry cut-in) relay for closing a trouble entry to an associated AMA recorder. (AMA, CAMA)
SA6 01	TGR	Test Group Relay The UG relay (in the transverter) which verifies the path of the cross detection feature XG relay (in the transverter) failed to operate. (AMA)
SA6 02	OP1	Open P1 Lead This lead is used only on transverter test connections. The master test control circuit operates the transverter OP1 (open P1 lead) relay to stop progress of the transverter on a selected line of entry so that a trouble record may be taken of the transverter output for this line of entry. (AMA, CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA6 03,04 10-12		Unassigned
SA6 13	P	Perforate a. False ground on P (perforator) lead in transverter while transverter is normal (standing test). b. The AMA recorder grounds the P lead to transverter as a signal that it is ready to perforate. c. The AMA recorder grounds the P lead to master timer as a signal that it is ready to perforate. (AMA, CAMA)
SA6 14	DTK	Trunk Check The operation of the AMA recorder DTK relay over DTK lead from transverter. This signals that the trunk involved had been identified and the AMA recorder is prepared for perforation of the last line of an entry. (AMA, CAMA)
SA6 20	PT1	Perforation Timing 1 a. False ground on PT1 (perforator timing) lead in transverter while normal (standing test). b. Transverter grounds PT1 lead to AMA recorder to operate PTC relay in the AMA recorder when perforating the last line of an entry. c. Master timer grounds PT1 lead in AMA recorder to control timing for perforating the recorder number entry. (AMA, CAMA)
SA6 21	DTN	Trunk Number a. A false ground on DTN (trunk number) lead in transverter when normal (standing test). b. Transverter grounds DTN lead to AMA recorder to operate the AMA recorder DTN relay, when ready to perforate the last line, thus showing satisfactory trunk identification. c. Master timer grounds DTN lead to AMA recorder. (AMA, CAMA)
SA6 22	PT	Perforator Timing a. False ground on PT (perforating timing) lead in transverter while normal (standing test). b. Transverter grounds PT lead to AMA recorder to operate the AMA recorder PTC relay when perforating any but the last line entry. c. Master timer grounds PT lead to AMA recorder. (AMA, CAMA)
SA6 23	PAK	Paper Advance Check Operation of the perforator paper-advance magnet. (AMA, CAMA)
SA6 24	CK	Check a. False ground on CK (check) lead in transverter, when normal. b. Transverter grounds CK lead to advance the AMA recorder from the trouble condition which caused it to block. c. Master timer grounds CK lead to AMA recorder. (AMA, CAMA)
SA6 30	P1	Perforator Control 1 a. False ground on P1 (perforator release) lead when transverter is normal. b. AMA recorder grounds P1 lead to transverter when transverter is to release its perforator magnet cut-in relay for that particular entry. c. AMA recorder grounds P1 lead to master timer when master timer is to release its perforator magnet cut-in relay for that particular entry. (AMA, CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA6 31	LC	Line Complete The AMA recorder has completed a single-line timing entry, with associated checks, and has started to release. (AMA, CAMA)
SA6 32	DS	Disconnect Start a. False ground on DS (disconnect start) lead when transverter is normal. b. Transverter grounds DS lead to AMA recorder as a disconnect signal after the AMA recorder signals that the last line is perforated. c. Master timer grounds DS lead to AMA recorder as a disconnect signal after the AMA recorder signals that the last line is perforated. (AMA, CAMA)
SA6 33	RD	Release Call Identity Indexer The operation of the AMA recorder RD relay indicates the talking charge relay had functioned in the trunk and the AMA recorder is now to release the call identity indexer. Also operated on initial entries upon seizure of the AMA recorder by transverter. This releases any previously operated tens and units relays in the call identity indexer. (AMA, CAMA)
SA6 34	TBL	Trouble Encountered The AMA recorder functioned to notify the transverter or master timer that a trouble had been encountered and that the trouble recorder should be seized and an appropriate trouble entry should be perforated. (AMA, CAMA)
SA6 40	PTS	Perforator Trouble Start a. False operation of a perforator magnet when AMA recorder is normal. b. The AMA recorder functions to begin a trouble entry on a trouble encountered by the AMA recorder on answer-disconnect entries. (AMA, CAMA)
SA6 41,42		Unassigned
SA6 43	BSP	Before Splice Pattern The master timer timed out before completion of the splice pattern while perforating an end-of-tape pattern.
SA6 44	ASP	After Splice Pattern The master timer timed out after completion of the splice pattern while perforating an end-of-tape pattern.
SA6 50	DA	Day Record The master timer timed out while perforating the day record on an end-of-tape pattern.
SA6 51	HR	Hour Record The master timer timed out while perforating the hour record on an end-of-tape pattern.
SA6 52	SC	Straddle Call The master timer timed out while perforating a straddle call entry on a transferred end-of-tape pattern.
SA6 53	SY	Synchronized The master timer and the AMA recorder were in synchronism at time of perforating an end-of-tape pattern.

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA6 54	NS	Not Synchronized The master timer and the AMA recorder were not in synchronism at the time of perforating an end-of-tape pattern.
SA7 00	RN	Recorder Number Entry The master timer timed out while perforating the recorder number entry on an end-of-tape pattern.
SA7 01	MO	Month Entry The master timer timed out while perforating the month entry on an end-of-tape pattern.
SA7 02	MG	Marker Group Entry The master timer timed out while perforating the marker group entry on an end-of-tape pattern.
SA7 03	SPA	Splice Pattern Applied Entry The master timer timed out while perforating the splice pattern on an end-of-tape pattern.
SA7 04	SKP	Skip Splice Entry The master timer timed out while perforating the skip splice entry on an end-of-tape pattern.
SA7 10-12		Unassigned
SA7 13	X	Cross-detected A transverter cross-detecting relay operated, in turn operating the X relay of the transverter as a trouble signal. (AMA)
SA7 14	XPL	Crossed Perforator Leads The master timer, while normal, detected a false battery or ground on the perforator leads toward an AMA recorder or had detected false ground on perforator leads within the master timer. (A false ground on the perforator leads toward an AMA recorder will register A' to F' indications, but a false battery on the perforator leads toward an AMA recorder or a false ground on the perforator within the master timer is not registered on the A' to F' indications.)
SA7 20	XRST	Crossed Recorder Start Lead The transverter detected a falsely grounded AMA recorder start lead. (AMA)
SA7 21	XRL	Crossed Release Lead A transverter detected: a. A falsely grounded RL lead. b. A premature operation of the RL relay. c. A falsely grounded TR lead. d. A premature operation of the P5 relay. e. Contacts crossed on the RTR, TAL, TM3, SDT2, RL, TRBA, TBY, or TEC relays. (AMA, CAMA)
SA7 22	XIC	Crossed Identifier Control Leads A transverter detected: a. A falsely grounded TIC (trunk identification control) lead toward the trunk. b. A premature operation of transverter TOK (trunk okay) relay or RK relay. c. A false battery or ground on XICA (identification control) lead within the transverter. (AMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA7 23	XICK	Crossed Identifier Control Check The transverter detected a premature operation of either its IC, ICK, or DCB relays. (AMA, CAMA)
SA7 24	XNL	Crossed Number Leads The transverter, while normal, detected a false ground on one or more of the following leads to the transverter connector: A0-A7, B0-B7, C0-C7, D0-D7, E0-E7, F0-F7, G0-G7, H0-H7, J0-J7, and M'7. (AMA)
SA7 30	XP	Crossed Perforator Leads The transverter, while normal, detected a false battery or ground on one or more of the following perforating and signaling leads from the transverter to the AMA recorder: A'0, A'2, B'0-B'7, C'0-C'7, D'0-D'7, E'0-E'7, F'0-F'7, P, P1, PA, PT, PT1, TCT, DS, and DTN. If the P, P1, DS, DTW, PT, or PT1 indications are perforated on the trouble recorder card, it indicates that these leads are grounded, otherwise they had false battery on them to cause a trouble reaction. (AMA, CAMA)
SA7 31	XRB	Crossed Recorder Busy Leads The transverter had detected a falsely grounded RB (recorder busy) lead to an AMA recorder. (AMA, CAMA)
SA7 32	XTL	Crossed Tens Leads The AMA recorder detected a cross between two TC lead contacts on the same TL- relay in the call identity indexer. The XTL is always accompanied by XTC, but an XTC is not always accompanied by the XTL. (AMA, CAMA)
SA7 33	XTC	Crossed Trunk Control The AMA recorder detected: a. False ground on XTC or XTC1 leads to the call identity indexer. An XTC indication without an XTL shows that two or more TL- relays in the call identity indexer had operated. b. False ground on XTC or TC1 leads on a transverter type of call. (AMA, CAMA)
SA7 34	XU	Crossed Units Leads The transverter detected: a. False battery on XT lead to the AMA recorder. b. False ground on UK lead to the AMA recorder. c. More than one units relay in the call identity. indexer had operated. (AMA, CAMA)
SA7 40	XTKK	Crossed Trunk Check The transverter detected a false ground on DTK or DTKA leads to the recorder. (AMA, CAMA)
SA7 41	XP1	Crossed Preference Chain The AMA recorder detected a cross on the contacts of its preference chain relays IP, HP, TP-, and MTP. (AMA, CAMA)
SA7 42	XT1	Crossed Tens The AMA recorder detected: a. Crossed top 1 and 2 contacts of a T- relay in the call identity indexer when that particular T-relay is operated. b. Open bottom 1 and 2 contacts of AT- relay in the call identity indexer. (AMA, CAMA)

Card Coordinates	Punch Designation	Functional Meaning and Indication
SA7 43	XU1	Crossed Units The AMA recorder detected an open or a cross at the top 1 and 3 and bottom 2 and 3 contacts of a U-relay in the call identity indexer. (AMA, CAMA)
SA7 44	XCK	Crossed CK Lead The transverter detected a falsely grounded CK lead to an AMA recorder. (AMA, CAMA)
SA7 50	XOF	Crossed Overflow Lead The transverter detected a falsely grounded OF lead to a transverter connector. (AMA)
SA7 51	X2P	Crossed Perforator Check The transverter detected operation of more than one P1K-P4K (perforator check) relay for the same line of entry. (AMA, CAMA)
SA7 52	XVF	Crossed Vertical File The transverter detected the operation of more than one VF- (vertical file) relay in the translator. (AMA)
SA7 53	XET	Crossed Equipment Terminals The transverter detected a false ground on or cross between two or more equipment terminals in the translator. (AMA)
SA7 54	XVG	Crossed Vertical Group The transverter detected the operation of more than one G- (group) relay in the translator. (AMA)
SA8 00-04 10-14 20-24 30-34		Unassigned
SA8 40	XIN1	Crossed Billing Indexer Lead 1 Relay XIN1 was operated in the transverter by the Billing Indexer circuit. This indicates that a cross is present on either the ROP or PRL lead between the Billing Indexer and the transverter. (CAMA)
SA8 41	XIN2	Crossed Billing Indexer Lead 2 Relay XIN2 was operated in the transverter by the Billing Indexer Circuit. This indicates that a cross is present on either the 2L, 4L, TC, VTC or DNC lead between the Billing Indexer and the transverter. (CAMA)
SA8 42	XIN3	Crossed Billing Indexer Lead 3 Relay XIN3 was operated in the transverter by the Billing Indexer circuit. This indicates that a cross is present on either the OINO, 1,2,4,7 or MBIO, 1,2,4,7 leads between the Billing Indexer and the transverter. (CAMA)
SA8 43	XRA-	Cross Recorder Start Leads The transverter has detected a falsely grounded recorder start lead or a falsely operated RST- relay. (CAMA)
SA8 44	XS	Cross Sender Connector More than one S- (Sender) relay in an outgoing sender connector operated. (CAMA)
SA8 50-54		Unassigned

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DEPT. 2311-DJM-JWD-D1